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A PLEA FOR CLOSER INTERRELATIONS IN OUR WORK[1]

IT is the plan of our secretary to depart from the usual symposium idea this afternoon. Instead of selecting a single topic upon the various aspects of which in turn our attention is to be focused, he has asked to have addresses on different topics, evidently with the idea that we may be led to realize more fully the diversity of interests now encompassed in Section G.

This at once suggests the problem which has been formulating more clearly each year in the field where my own chief interests lie, that of plant pathology. Most of the work in this field, at least so far as it presents the problem, is of two easily definable types, which, while in some ways widely different, nevertheless, have much in common. These are, first, the training of graduate students for professional work as phytopathologists, second, the direction of research work supported by public funds, either state or national. Outside of these two fields, we have only the limited activities represented, on the one hand, by undergraduate teaching, and, on the other hand, by research privately supported. I

[1] The paper as above published is a combination of two symposium papers read by the author at the recent Cleveland meetings, as follows: (1) "A Plea for Closer Interrelations in our Work." Read at the Botanical Symposium, Section G, December 31, 1912. (2) "Some International Aspects of Phytopathological Problems." Read at the Symposium of the American Phytopathological Society, January 2, 1913. The other papers read at this Symposium are being published in *Phytopathology*. In order to make the theme continuous, the second paper has been abridged and modified somewhat, but without essential change of idea.

omit, of course, public teaching or extension service as not concerning the higher aspects of the problem.

Directing our attention, then, to these two main lines of phytopathological activity—the effective prosecution of the higher lines of research and the best professional training of graduate students—the fact is becoming increasingly clear that in both lines it is of paramount importance to recognize that the complex interrelations with other departments of botanical and allied sciences are each year becoming more intricate and vital, and the need of deliberate correlation of endeavor is, therefore, becoming more imperative. Neither in research nor in graduate training can any man live by himself or to himself alone.

Many of us, in phytopathology at least, have been undergoing a transition in relations without perhaps fully realizing its significance. We shaped out individual or institutional ideals with reference to the purely local aspect of research problems or to the educational needs of the student of the more generalized type. This has meant that in the one department of one institution, and perhaps under the leadership of one man, the student has been introduced to the various aspects of botanical science, and work upon problems of widely different types has been undertaken. The futility of this having become evident with our higher aims and the increasing complexity of our modern scientific development, we have naturally substituted the university as the unit instead of the man or the department.

This seems to-day to be the dominant ideal in American university administration and departmental organization. We wish to make each great university *complete in all its parts and wholly sufficient unto itself*. At least if we are not doing so positively, we are negatively, by not clearly defining any higher or better ideal.

As a matter of fact, however, we have arrived at the stage where the highest efficiency and economy in research and the best training for graduate men alike demand the clear recognition of the importance of specialization, with correlation and cooperation, not only as between men and departments, but as between institutions.[2] No one man can be the best leader in all lines. No one laboratory has the best equipment for all purposes. No one library or herbarium is likely to be kept at the highest stage of working efficiency for all botanical problems. No one locality offers the natural or artificial environment best suited to meet all of the diverse needs of a single problem. *It is, therefore, both extravagant and futile to encourage the ideal of university completeness.*

For example, take the botanical gardens in America. All are, of course, agreed as to the usefulness of the moderate-sized garden for general college uses, or of the small but highly specialized garden for individual researches. But I think every one recognizes the tremendous cost, both in money and in executive skill, which is required to organize and develop the large botanical garden, planned and maintained as a general research center. I doubt not that most will agree, therefore, that it is better for botanical research in America to have the botanical gardens at Bronx Park and St. Louis equipped and kept at the highest possible degree of efficiency, sustained by the scientific recognition and moral support of the neighboring universities, rather than to encourage the ideal of an extensive botanical garden at every university.

[2] The need of better correlation in botanical work was also strongly urged by Dr. C. E. Bessey in his presidential address at the Cleveland meeting of the American Association for the Advancement of Science. See page 11 of the current volume of SCIENCE.

The same holds with other departments or their adjuncts. What we need in American university ideals to-day is clearly and definitely to substitute the idea of institutional preeminence secured by specialization for that of a uniform grade of mediocrity imposed by the attempt at all-round equipment and attainment. And whatever we say as to the abstract principle, we shall at once see, if we compare our university curricula and analyze the situation, that this is what we are more and more clearly tending toward in our institutional developments. Specialization is an essential corollary of scientific progress. This is a universal law and applies as well to institutions as to men. This being so, it follows that just in proportion as we recognize institutional specialization we must have *institutional correlation and cooperation as an avowed and approved policy.*

Let us consider what this may signify for the two lines of endeavor in phytopathology, viz., research and graduate training.

Research.—In so far as phytopathological or similar research is supported by public funds and aims to meet economic needs, as is the case with most of the research work in plant pathology, the arguments for correlation, and indeed for cooperation, are becoming increasingly pertinent and convincing. There can be no doubt that this is the only attitude morally or scientifically justifiable. But of course this is not a thing to be secured by official fiat or rule. Indeed, no definite modes of procedure may safely be formulated. Such correlation or cooperation to be properly helpful must, to a large degree, be a matter of individual initiative and personal relation and the details must in general be left to individual workers and developed to meet the exigencies of special cases as they arise. The fundamentally important thing, however, in order to pave the way for this, is the *general recognition of the propriety of such a course and the impropriety of any other.*

This implies the idea that state or nationally supported investigations should be so correlated as either to avoid duplication or to make the duplication of the highest scientific value. Every one experienced in any degree in such work recognizes the value of duplicated and repeated investigations. These advantages must not be sacrificed. On the other hand, every one recognizes also the prevalence of the wasteful type of work which has no such worthy aim or scientific justification. The details of accomplishing this, at least in a large degree, of eliminating the bad while saving the good, will, I am sure, present no insuperable difficulties if once the right principle is generally recognized.

Let us clearly define the ideal that *the facilities of any publicly supported institution are maintained primarily for the public good.* It follows at once that the courtesies of such experimental grounds, libraries, herbaria and laboratories are to be extended to men from other institutions with the utmost freedom compatible with non-interference with local work. If this is recognized by directors of laboratories and other administrative officers, and the ideal of correlation and cooperation as opposed to competition is commended, especially to our younger men, the balance may safely be left to the individuals concerned.

Graduate Training.—The other field in which there is the need of closer interrelations, and in some degree of correlations, includes our graduate schools. If the points already made are all well established, then it follows that we should in each of our graduate schools aim avowedly at *preeminence in certain lines*, rather than a uniform degree of excellence in all lines. If this is true then it follows again that any

graduate student seeking the best should look for leadership in more than one institution.

Most of us can recall the time when American graduate students in botany were turning to Europe for their higher training. To-day, we have the satisfaction of realizing that this is not necessary. In our American universities we now have the laboratory equipment, the libraries and a share of the personal leadership. Those qualified to compare testify that our standards are at least in as high a class as those of the European universities. Without going into familiar details, I wish at once to point out, however, that the most striking difference and defect in our American training, as compared with the German, is that it involves relatively less migration of our graduate students from university to university. All must at once admit this fact and all must lament it as unfortunate.

If this is so, we should earnestly ask why it is so and how is it to be remedied. There is neither time nor necessity for full analysis of the reasons for its existence. A partial list will suffice:

1. The geographical isolation of our botanical centers.

2. The lack of more definite recognition of the importance of institutional specialization.

3. Institutional loyalty or "college spirit" with its relative magnification of institutional prominence, rather than individual leadership.

4. The financial handicap of many a graduate student and, consequently, the attractiveness of the local financial inducements, scholarships, fellowships and assistantships, which, naturally, are offered to our own best students. This has been emphasized in recent years by the rapid institutional growth coupled with the great development of laboratory courses, which combine in demanding a large number of low-priced assistants.

5. The reluctance which every departmental head, of normal human constitution, feels at sending his best men to another institution before the completion of their graduate period.

6. The natural inertia on the part of immature students, which results from the American custom of staying by one institution: *A* stays because *B* and *C* stay, and they because *D* did the year before.

7. The fact that our graduate schools are not always so organized and managed as to make such a migration easy, simple and natural. The student can readily find out how he can get in as a beginner, but it is not so easy to learn what will be his status if he transfers.

If I have listed the more important reasons for lack of migration among our graduate students, then analysis of them shows clearly that the fault lies primarily, not with our students, but with our institutional and departmental directors—with ourselves as teachers.

To correct this we should do three things:

1. Prepare to welcome and provide for the transient student, the man who comes for one year or even one semester's work, with the same definiteness and the same departmental hospitality that we do for the man who is to stay two or three years.

2. Examine the administrative machinery and see that it is so designed, adjusted and lubricated as to make migration easy; that it is convenient for the doors to be swung both ways; that the able but transient student is admitted promptly and his work properly certified when he leaves; that attainments at other institutions are recognized at their full face value.

3. Finally, and hardest, remember that until the precedents are established and the

"habit" fixed the initiative may need to come from the instructor in charge rather than from the student. It may be a difficult thing, but it may be the right thing not infrequently, to send our keenest man to some one else for a semester or a year—even though it be the last year and the degree.

INTERNATIONAL RELATIONS

In addition to our home problems there are the international aspects of these matters of interrelation and cooperation. It is gratifying to realize that in some respects these have received more definite attention, and with better results, than those between our own institutions. This is especially true as relates to the two matters of individual research and graduate training. Dr. Farlow, in his delightful address,[3] has pictured the beginnings of American botanical student migration to Europe, and the majority in almost any botanical gathering have followed that lead. This matter needs no emphasis other than an expression of the hope that we shall not let provincial pride or overesteem of the value of our material equipments lessen the tide of student migrants to Europe, although it may well be that they continue to go with somewhat different aims than in former years.

There is, however, a broader aspect of international phytopathological problems which has not had adequate general recognition. The recent passage of the Simmons bill shows that, in some degree at least, this is dawning upon our national consciousness. This very bill, however, emphasizes the necessity for studying phytopathological problems in their international relations. Two things are especially needed to this end. First, administrators as well as investigators should recognize the importance of occasional visits by the American investigator to such foreign countries as will enable him to see his problems in their foreign setting. The relation of environment to the predisposition of the host, as well as to the virulence of the parasite, can not be over-emphasized and it is often impossible for the investigator of the local problem to realize this except as he may be temporarily translocated.[4]

Even more should our administrators see from time to time how great may be the gain from temporary or permanent employment of foreign experts. This has been done in the Department of Agriculture often enough and with sufficiently favorable results to justify its further trial. But there are inherent difficulties in the appointment of foreigners to permanent government positions and, moreover, the best of foreigners of mature experience can not be thus transplanted. Neither of these difficulties, however, arises in relation to the temporary employment of foreign experts. It seems to me that the time has come when this should be done with increasing frequency. It would result not only in giving us promptly the best expert advice for immediate application, but, what is scarcely less important, would give the foreign specialist such an understanding of the American problem as would make his further investigations more broadly inclusive of American conditions and insure results proportionately more valuable to us. Every student of the history of plant pathology recognizes the gain to England directly, and to science indirectly, which came from the employment of De Bary by the Royal Agricultural Society as expert upon the problems which arose in connection with the potato disease.

[3] See page 79 of the current volume of SCIENCE.

[4] This aspect of the discussion was set forth in detail by Dr. C. L. Shear in the second paper of the symposium before the American Phytopathological Society, January 2, 1913. Dr. Shear's paper is published in *Phytopathology*, 3: 77–87, April, 1913.

Who will measure the advantage to American plant pathology could we have had a professional visit of inspection with obligation for counsel from Aderhold, when he was at the height of his understanding of German orchard pathology; or who will estimate the stimulus to our progress upon cereal rust studies could we have brought Ward to America for even a brief sojourn when he was probing deepest into their fundamentals, providing he came commissioned and committed not alone to see but to advise? Surely if exchange professorships are scientifically and economically justifiable in any field, they are in plant pathology.[5]

In closing, then, let me briefly summarize with particular reference to phytopathology. I must leave it for those whose chief interests lie in other fields to dissent if my conclusions are not generally applicable, as I myself believe they are.

The points I would make are:

1. An understanding of the complex interrelations of our subject with the various fields of science is becoming each year more difficult and more imperative.

2. Educational and investigational work, especially where supported by public funds, should be correlated as closely as practicable on the grounds of both economy and efficiency.

3. One step looking to this should be an attempt by both departmental heads and general administrators in our graduate schools to encourage and facilitate the migration of graduate students from school to school and to locate their field operations where most favorable to the progress of their work.

4. Another step in this same direction should be an attempt at better correlation in state experiment station and national agricultural department investigations, coupled with more freedom in change of location of investigators.

5. These principles apply still more broadly to foreign relations, both as to graduate students and as to mature investigators. We need not only to make it easier for our graduate students to go abroad and to encourage our mature investigators to continue to do this with increasing frequency, but especially do we need so to arrange as to secure the official visits of foreign experts, both for advice on particular problems and to secure their intelligent general cooperation in working out our American problems.

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[5] The American Phytopathological Society after discussion of these points adopted the following resolution:

Resolved, That the American Phytopathological Society, appreciating the fact that plant diseases do not heed national limits or geographical boundaries and also the evident limitations imposed upon investigations when restricted by national bounds, respectfully recommend that administrators of research institutions, whether state or national, as well as individual investigators, recognize the importance of establishing closer international relations and take such steps as may be practicable from time to time to this end, including not only more frequent visits of American investigators to foreign countries for field observations as well as research, but also the securing, either by permanent or temporary engagement, of the best of foreign experts in plant pathology.

REPORT OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

(1)[1] During its 1913 (Monaco) session, the International Commission on Zoological Nomenclature has held ten executive meetings.

(2) The following nine active commissioners were present: Messrs. Allen, Blanchard, Dautzenberg, Hartert, Hoyle, Jentink, Monticelli, Stejne-

[1] For convenience of reference, the paragraphs or subjects of this report are given serial numbers in parentheses, thus: (1).

ger and Stiles. In addition, Messrs. K. Jordan and the Honorable Walter Rothschild, at the invitation of the commission, attended the meetings in an advisory capacity.

(3) The following active and advisory commissioners were not in attendance: Messrs, Apstein, Dollo, Jordan (D. S.), Ludwig and Mitchell.

(4) *Death.*—It is with profound regret that the commission reports the death of one of its members, Professor Dr. F. C. von Maehrenthal, who died in 1910, very shortly after the Gratz meeting. Putting entirely aside our feeling of personal loss as insignificant in comparison with the loss that Commissioner von Maehrenthal's death means to the international zoological profession, the commission feels that it is only just to pause a moment to recall to the members of this congress the modest character of this man who gave nearly his entire professional career to aiding his colleagues in their more tedious labors and than whom it would be difficult to find, in the entire history of zoology, any man with a keener insight into the intricacies and complications of zoological nomenclature with the possible exception of Linnæus and Strickland.

(5) *Resignations.*—During the interim since the 1910 session, the commission has received the following resignations, which are herewith reported to the congress with the recommendation that they be accepted:

Dr. G. A. Boulenger (London), who declined to serve.

Dr. Louis Dollo (Brussels), who begged to be excused from service, on the ground of poor health.

The resignation of Professor Hubert Ludwig (Bonn) has been received, but as his term of office expires with the present congress no formal action is necessary.

(6) *Advisory or Temporary Commissioners.*—Through the death of Dr. von Maehrenthal and the resignations of Drs. Boulenger, Dollo and Ludwig, the commission became reduced from 15 to 11 members. As it seemed very advisable not to permit the organization to decrease in size, and as there was no method of procedure prescribed whereby vacancies were to be filled in the interim between congresses, the commission, acting in the interest of the subject, invited certain gentlemen to fill the vacancies until these could be filled by the present congress. The gentlemen in question are as follows:

Dr. P. Chalmers Mitchell, secretary of the Zoological Society of London, was invited to serve in place of Dr. Boulenger.

Professor Kraepelin, of Hamburg, was invited to serve in place of Dr. von Maehrenthal; Dr. Kraepelin served but a short time, and Professor Apstein, of Berlin, was invited to fill the vacancy.

(7) Upon reaching Monaco, the commission invited Dr. K. Jordan, secretary of the International Committee on Entomological Nomenclature, and the Honorable Walter Rothschild to sit with the commission in an advisory capacity and this has been done.

(8) Since not a single majority vote has been determined by the gentlemen in question, and therefore their temporary membership on the commission has in reality been equivalent to their serving simply in an advisory capacity, the legality of the action taken can not be questioned on the ground that these gentlemen were not formally elected by the congress. At the same time, as a matter of formality, the commission at present asks that its action in respect to the vacancies be confirmed by the congress by the adoption of the following resolution:

(9) *Resolved,* That the informal action taken by the International Commission on Zoological Nomenclature in regard to filling vacancies be approved and ratified by this ninth congress and be made formal.

(10) In order to provide for similar contingencies in the future, the Commission recommends to the congress the adoption of the following resolution:

(11) *Resolved,* That in case of vacancies in the Commission on Zoological Nomenclature by death or resignation during the interim between congresses, said commission is empowered to fill said vacancies temporarily, with the understanding that the appointees shall hold office until the vacancies in question are filled by the next succeeding congress.

(12) *Expiration of Term of Service.*—The term of service expires at the close of this (1913, Monaco) congress for the following five members of the class of 1913:

J. A. Allen, of New York; Ph. Dautzenberg, of Paris; Hubert Ludwig, of Bonn; F. C. von Maehrenthal, deceased, of Berlin, succeeded temporarily by K. Apstein, of Berlin; W. E. Hoyle, of Cardiff.

(13) *Nominations.*—In accordance with custom obtaining since the Cambridge (1898) congress, the commission, after careful consideration as to details of the work, of countries, languages, specialties, etc., herewith has the honor to submit nominations to fill the seven vacancies that will

exist upon adjournment of the present congress. These nominations are:

Class of 1919: Professor C. Apstein, of Berlin, Germany (Professor von Maehrenthal's successor in the office of Das Tierreich), *vice* Professor Louis Dollo, of Brussels, resigned.

Professor Roule, of the Paris Museum, *vice* G. A. Boulenger, resigned.

Class of 1922: Dr. J. A. Allen, of the American Museum of Natural History, New York, *vice* J. A. Allen, term expired.

Ph. Dautzenberg, of Paris, *vice,* Ph. Dautzenberg, term expired.

Professor H. J. Kolbe, of the Berlin Museum, *vice* Professor Hubert Ludwig, of Bonn, term expired.

Dr. Wm. Evans Hoyle, director of the National Museum of Wales, at Cardiff, *vice* W. E. Hoyle, term expired.

Dr. Karl Jordan, secretary of the International Committee on Entomological Nomenclature, *vice* F. C. von Maehrenthal deceased and term expired.

(14) *Proposition to enlarge the Commission.*—This commission originally consisted of five members, elected at the Leyden congress in 1895. Upon recommendation of the original commission, the Cambridge (1898) congress increased the number of commissioners to fifteen. The present commission is of the opinion that it is now in the interest of the subject to increase the membership from fifteen to eighteen with the understanding that the three new commissioners shall be so arranged that one joins the class of 1916, one that of 1919 and one that of 1922. The commission is led to this recommendation by several reasons, notably by the three following: (1) there exists at present an excellent opportunity to cooperate in work on the nomenclature of entomology and the situation is such that the commission desires the services of two additional entomologists in this connection; (2) the work of the commission has increased to such an extent that it seems in the interest of the subject to have three more men available for service; (3) the commission feels that it is desirable to return to its former policy of having a paleontologist among its members and in view of the present amount of work before us this will be difficult unless authority is given for the appointment of the additional men requested. If the congress authorizes the three additional men, the commission is prepared to make the nominations required, as follows:

Class of 1916: Dr. Henry Skinner, of the Academy of Natural Sciences, Philadelphia.

Class of 1919: Dr. Geza Horváth, of Budapest.

Class of 1922: Dr. F. A. Bather, assistant keeper of geology, British Museum of Natural History, London.

(15) *Offers of Cooperation.*—It is a pleasure to report that two nomenclatorial committees have, since the last congress, made overtures to the commission to cooperate in work.

One offer of cooperation has come from the Committee on Nomenclature of the American Paleontological Society and consisting of Wm. H. Dall, F. H. Knowlton and S. W. Williston (secretary).

Another offer of cooperation has come from the International Committee on Entomological Nomenclature.

(16) In this connection it may be stated that a working arrangement has been made between the secretary of the International Committee on Entomological Nomenclature and the Secretary of the International Commission on Zoological Nomenclature, in accordance with which all questions on entomological nomenclature will be referred to the International Committee on Entomological Nomenclature for study as to premises and for report before any opinion on them is issued by the International Commission, and attention is invited to the fact that the secretary of the Committee on Entomological Nomenclature has been nominated for membership in the International Commission. Whether the time will ever come that the International Commission on Zoological Nomenclature will consist chiefly or exclusively of the secretaries of various international committees representing special groups remains to be seen.

(17) *By-laws.*—The commission has made no amendment to its by-laws since 1910, but attention may be invited to the fact that the president is the presiding officer and that the secretary is the administrative officer. If, therefore, any person desires to submit propositions to the entire commission, time will be saved if they are sent directly to the secretary, whose permanent address is: Hygienic Laboratory, U. S. Public Health Service, Washington, D. C.

(18) In order to avoid misunderstanding in the future, attention may be invited to the fact that the commission does not feel called upon to consider any communication addressed to it only through the medium of journals or the proceedings of learned societies. To insure consideration of communications the latter may best be sent direct

to the secretary and if their receipt is not acknowledged within a reasonable time the conclusion may safely be drawn that they were never received.

(19) *Official List of most Frequently Used Zoological Names.*—The Gratz congress adopted a recommendation by the commission to the effect that an attempt be made to establish, on basis of the International Rules of Nomenclature, an "Official List of most Frequently Used Zoological Names." In accordance with this vote, the secretary invited a number of workers to form themselves into special committees and to cooperate in the undertaking, and he submitted to several of these committees lists of names for study.

(20) The vigorous protests received from various sources were not foreseen. Some zoologists protested against the proposed list on the ground that this was the beginning of a list of "Nomina conservanda" to which they would not submit; others demanded that the secretary agree that the list be made without reference to the law of priority; some practically challenged the right of the commission to undertake the work; others flatly refused to cooperate; some agreed to cooperate and did so; others promised aid that has thus far not been forthcoming.

(21) In view of the great dissatisfaction with the proposed list, the secretary finally decided that the wisest plan would be to submit to the commission only a comparatively small number of names as a sample of what was proposed and to postpone further action on the matter until the commission might discuss the situation and lay its views before the congress for further consideration.

(22) The commission submits herewith a sample of what it had in mind in suggesting the official list. This consists of an *accepted* list of 40 generic names which appear from our present knowledge to be valid under the code and a *rejected* list of names which appear to be unavailable under the code.

(23) The commission recommends that this be taken as a beginning and that names be very gradually and carefully selected to be added to the list. It will, however, be impossible to build out this nomenclator unless cooperation is had from systematists in the different groups. With proper cooperation, however, the commission is persuaded that 100 to 500 accepted names and as many or more rejected names might be added to the list every three years and that in this way not only would we obtain a list of established names for the genera most frequently referred to but that many useless names could be definitely eliminated from literature. The commission does not desire, however, to continue this very time-consuming labor unless there is a very distinct desire on the part of zoologists to have the work done and a willingness to cooperate in the undertaking.

(24) The names suggested as samples for adoption are distributed as follows: Trematoda, 11; Cestoda, 5; Nematoda, 7; Gordiacea, 2; Acanthocephala, 1; Arachnoidea, 8; Diptera, 6. Practically all of these come into consideration not only in zoological, but also in medical and veterinary literature.

(25) Public notice has been given that these names would be called up for vote at this (1913) meeting of the commission and ample opportunity has been afforded for the presentation of objections. No objection to any name in the list as now submitted has been presented to the commission.

(26) In addition to the list of 40 names submitted for action at the present meeting, the commission submits a list of 169 generic names of birds, with their authorities, references, genotypes and method of type fixation, based on the International Rules of Zoological Nomenclature and unanimously agreed upon by a special committee of professional ornithologists, upon which the following gentlemen served: J. A. Allen (New York), E. Hartert (Tring), C. E. Hellmayr (Munich), H. C. Oberholser (Washington), C. W. Richmond, secretary (Washington), R. Ridgway (Washington), L. Stejneger (Washington) and W. Stone (Philadelphia).

(27) It is the intention of the commission to send this list of names to press in the very near future and to give ample opportunity to the zoological profession to offer objection to any of the names in question. Shortly after January 1, 1914, the commission contemplates announcing the fact whether or not objection has been raised and will issue an opinion regarding the adoption of the list. This opinion would then be laid before the Tenth International Congress for confirmation.

(28) A third list, consisting of 430 names "*to be rejected,*" is submitted by the commission. These names also have been made public with invitation to zoologists to present arguments showing why any of said names should not be rejected. This list is to be interpreted simply as follows: Word has reached the commission in one form or another that these names are absolute homonyms and therefore (Art. 34) unavailable; under these

circumstances the commission will consider the names in question as stillborn unless evidence is presented that the premises now before the commission are erroneous; further, the commission suggests to authors that they cooperate in the work by either correcting the premises before the commission or by discontinuing to use the names. The *"To be rejected"* list consists thus far of 430 generic names, distributed as follows: Trematoda, 22; Nematoda, 40; Gordiacea, 1; Acanthocephala, 2; Diptera, 92; Mammalia, 273.

(29) Many other names, supposedly valid or supposedly unavailable, are still under consideration either by the commission or by the several special subcommittees, but no further work in this line is contemplated unless the present congress distinctly expresses its desire to have the labor continued.

(30) In the opinion of the commission, work of this nature is distinctly constructive and promises the ultimate possibility of an international and authoritative list of the names that should be applied to the most commonly cited 5,000 to 10,000 zoological genera.

[Here follow the lists of names. These will appear in the Proceedings of the Congress.]

(46) *Presumable Permanency of the Official List.*—That the question as to the presumable permanency of the Official List based upon the law of priority may arise in the minds of many zoologists is to be taken as self-understood. This question may be answered as follows:

(47) Changes in names dependent upon changes in conceptions of classification can not be foreseen from one generation to the next and any plan for nomenclature that ignores this point makes promises that can not count upon being fulfilled. The following statistics, however, worked out by Lester F. Ward (1895) give an indication of the changes that may reasonably be expected to occur upon nomenclatorial grounds:

(48) By taking the first 50 genera given in the American Ornithologists' Union Check-List, it is found that in only five cases did the generic name remain unchanged from 1859 to 1886. Thus prior to the establishment of the names on basis of the law of priority, 45 of the 50 names (or 90 per cent.) changed from 1859 to 1886. From 1886 (when the names were established on basis of the law of priority) to 1895, not one of the 50 names was changed. The complete list embraced 322 genera and about 1,000 species and subspecies. In the ten years following the publication of the list (based upon priority), it was found necessary to change, by action of the law of priority, the names of 3 genera, 1 subgenus, 3 species and 1 subspecies.

(49) The commission invites the serious attention of the congress to these very remarkable results obtained by the code of the American Ornithologists' Union. If our international code is properly safeguarded against changes taken hastily and without due deliberation as to the many complications involved, it may reasonably be expected that our International Official List will undergo very few changes, upon nomenclatorial grounds, but this commission can not possibly foresee what changes must be adopted during the next 10 to 100 years because of unforeseen changes in conceptions of classification.

(50) The commission has the honor to request definite instructions from the congress as to whether or not it is the desire to have this list continued.

(51) *Code of Ethics.*—The commission permits itself to invite attention to the fact that there exists in the zoological profession no recognized and generally adopted code of ethics that is comparable to the code of ethics existing in the medical profession of certain countries. Without presuming to be the arbiter of points of general ethics, the commission is persuaded that there is one phase of this subject upon which it is competent to speak and in reference to this point it suggests to the congress the adoption of the following resolution:

(52) WHEREAS, Experience has shown that authors, not infrequently, inadvertently publish, as new designations of genera or species names that are preoccupied, *and*

WHEREAS, Experience has also shown that some other authors discovering the homonymy have published new names for the later homonyms in question, *be it therefore*

Resolved, That when it is noticed by any zoologist that the generic or the specific name published by any living author as new is in reality a homonym and therefore unavailable under Articles 34 and 36 of the Rules on Nomenclature, the proper action, from a standpoint of professional etiquette is for said person to notify said author of the facts of the case and to give said author ample opportunity to propose a substitute name.

(53) *Date of Author's Reprints or Separata.*—Among the cases recently submitted to the commission for opinion is one that involves a somewhat unusual point in respect to reprints. Under the present rules there is no article which permits the commission to rule that all separata are

of the same date as, or of a later date than, the original publication, although such a proposal has now been submitted as an amendment to the rules and will be considered in time for the Tenth Congress. In the meantime, the commission has instructed the secretary to report the following resolutions to the congress:

(54) *Resolved,* That the commission, under unanimous suspension of the by-laws if need be, recommends to the congress the adoption of the following resolution, namely:

(55) WHEREAS the widespread custom of issuing reprints in advance of the appearance of the original publication gives rise to much unnecessary confusion in nomenclature, be it

(56) *Resolved,* That the Ninth International Zoological Congress expresses its disapproval of this custom and appeals to editors to discontinue it, and further, be it

(57) *Resolved,* That editors be requested to give on each edition of all publications the exact date (year, month, day) of issue of said edition.

(58) *Opinions.*—At the Boston (1907) congress the commission reported upon opinions 1 to 5 inclusive; at the Gratz (1910) congress it reported upon opinions 6 to 28 inclusive; at the present congress, it herewith reports the summaries of opinions 29 to 56 inclusive. The full opinions have been published by the Smithsonian Institution, Washington, D. C., as Publications Nos. 1938, 1989, 2013, 2060; No. 2169, containing opinions 52 to 56 inclusive, is now in proof and will soon be issued. Attention is invited to a correction of opinion 31 published on page 89, Publication No. 2060.

The commission regrets to hear that some zoologists claim to have been unable to find copies of these opinions and desires to state that they are sent to 1,100 libraries, to the members of the International Congress and to a limited number of specialists. Only the summaries are issued in the proceedings of the congress. If any member of the congress fails to receive the full opinions, he is invited to notify the secretary of the commission.

At its present session the commission has taken a preliminary or a final vote upon several additional opinions and it now has under consideration about 15 other cases that have been submitted to it for study.

[Here follow the summaries of opinions 29–56.]

(59) The opinions have now been a policy for six years. They have been received by various zoologists in different ways. Some of our colleagues in the profession are urging us to continue this policy, on the ground that it is the logical method of settling difficult questions. Others are opposed to the policy and one man has even practically challenged our right to issue the series.

(60) This commission is well aware of the fact that in issuing 56 opinions we have not been able to decide on both sides of every question and thus to please every person.

(61) It may not be out of place to remark that these opinions have recently probably been the greatest factor in pressing to the fore the law of priority and in producing discontent. Formerly, so long as two authors could not agree upon a given point of nomenclature, each followed his own interpretation. If one of these authors now submits the case to the commission, an opinion is rendered which, of course, has not the force of law, but which nevertheless is a strong moral support to one side of the controversy in question. Experience has, however, shown that instances are not lacking when the commission by giving its opinion has drawn upon itself the fire which in earlier days would have been directed to the individual worker in whose favor the opinion happens to be given. And it has come about that the commission has not been permitted to remain ignorant of the fact that it has perhaps made fewer friends than enemies in its endeavor to conform to the wishes of our colleagues to settle cases for them.

(62) The commission does not consider that in rendering these opinions it is placing itself under any obligations whatever to zoologists for the privilege of doing so much work for other people, and is perfectly willing to discontinue the series. In continuing to give opinions, however, the commission can not be expected to depart from the code and to make exceptions in order to please individual workers. If the congress is not satisfied with the results, it will be an easy matter for the congress to say so.

(63) The commission as at present constituted feels it proper, however, to remind zoologists that in the performance of our duties we are not supposed to take into consideration any personal preferences or any local, factional or personal quarrels—such as have actually been presented to us as if they were valid nomenclatorial argument.

(64) *Increasing Interest in Nomenclature.*—Probably at no time in the history of zoology has there been a more widespread interest in the subject of nomenclature than exists at present. This interest is probably due to several factors, one of which is the increased sense of necessity or at least desirability for international uniformity in use of

technical names. As authors increase in number and attempt to monograph various groups the lack of uniformity in the use of names is brought home to them, and no matter what policy they may try to follow they usually find it necessary to change some of the names more or less current in their group. Under existing rules and under all standard codes since 1845, and in spirit at least since the Linnean Code of 1751, the law of priority has in general been taken as fundamental criterion in deciding certain classes of the changes, and in fact so many points have been made upon basis of this law that it has aroused opposition from certain quarters.

(65) In this connection it is interesting to note that if an author changes from *Amœba* to *Ameba*, or from *Amœba vulgaris* to *A. princeps*, or if he makes a change of name and gives as his reason the fact that the rejected name does not please him, or even if he divides an old collective genus into 40 or 50 new genera, introducing 39 or 49 new names and retains the old collective generic name for the indefinite residuum, his action is not very likely to produce any particular indignation, but if any author consistently applies the law of priority, thus attempting to settle all cases objectively he becomes what one author is pleased to call a "fanatic priority ruler."

(66) As authors are increasing in number and as publications become so numerous, both the application of the law of priority and the protests against the law increase.

(67) The commission is distinctly gratified if its efforts have contributed in even a small degree to the present increased interest in the subject. It may, however, be permitted to invite attention to three phases of the present status of the subject which are somewhat disquieting.

(68) 1. *Intemperate Language.*—Whether or not it be an actual fact, appearances to that effect exist that if one author changes or corrects the names used by another writer, the latter seems inclined to take the change as a personal offense. The explanation of this fact (or appearance, as the case may be) is not entirely clear. If one person corrects the grammar of another, this action seems to be interpreted as a criticism upon the good breeding or education of the latter person. Nomenclature has been called "the grammar of science," and possibly there is some inborn feeling that changes in nomenclature involve a reflection upon one's education, culture and breeding. Too frequently there follows a discussion in which one or the other author so far departs from the paths of diplomatic discussion, that he seems to give more or less foundation to the view that there is something in his culture subject to criticism. It is with distinct regret that the commisson notices the tendency to sarcasm and intemperate language so noticeable in discussions which should be not only of the most friendly nature, especially since a thorough mutual understanding is so valuable to an agreement, but which are complicated and rendered more difficult of results by every little departure from those methods adopted by professional gentlemen.

(69) In the opinion of the commission the tendency to enter into public polemics over matters which educated and refined professional gentlemen might so easily settle in friendly and diplomatic correspondence is distinctly unfavorable to a settlement of the nomenclatorial cases for which a solution is sought. It may be assumed that the vast majority of zoologists agree with the commission in desiring results rather than polemics, and the commission ventures to suggest that results may be obtained more easily by the utmost consideration for the usual rules of courtesy when discussing the views of others.

(70) 2. *Education in Nomenclature.*—It may safely be asserted that comparatively few zoologists upon beginning their independent professional career have even a general idea of the subject of nomenclature, for the reason that zoological grammar (namely, zoological nomenclature) is not usually taught in courses leading to the bachelor's, the master's or the doctor's degree. Without wishing to emphasize the point unduly, the commission ventures to suggest that it would be in the interest of harmony if at least the elementary rudiments of the subject were taught more generally to students preparing themselves for a career as professional zoologists.

(71) 3. *The Immensity of the Task before Us.*—Despite the quite generally increased interest shown in the subject of nomenclature, there are some grounds for disquiet in the fact that relatively so few workers seem to grasp the immensity of the task involved in introducing harmony of system among so many different groups and in bringing about satisfactory conditions among so many hundreds of thousands of technical names scattered over so many different publications written or edited in so many instances by workers who, despite their erudition in respect to their subject, were so to speak not exactly grammatical—or at least rhetorical—when it came to their technical names.

(72) That present conditions are to be settled in a day or in a few years is not to be expected. The transitional period between the lack of uniformity in the past and the hoped-for uniformity of the future will last at least one entire generation, and to our generation falls the pleasure or the misfortune (according to one's point of view) of undertaking the extensive and distinctly altruistic duty of saving future generations of scientific workers from the dangerous inheritance of chaotic nomenclature that threatens them.

(73) Stability in *all* zoological names during our generation is not in the dreams of the members of this commission, which at your request undertook eighteen years ago a most trying, most thankless and very extensive task, for which the only reward in its successful accomplishment exists in the thought that our work is a sacrifice.

(74) That many of our colleagues should differ with us in point of view does not disquiet us, but it is a matter of some misgiving to us that some of our colleagues are (or at least *seemingly* are) of the opinion that the difficulties at hand are to be settled so easily and in a few years.

(75) The transitional period will be mentioned again in connection with the reference to the law of priority.

(76) Whatever the outcome of the present situation, the commission desires to express its gratification of the fact that, judged from the various postal card votes that have recently been taken, many persons to-day are hearing of the rules of nomenclature who probably rarely if ever heard of them before and many others are taking an active interest who formerly ignored the subject. At the same time the feeling that has been exhibited in some instances leads the commission to the view that the present occasion is one that calls for cool and calm deliberation rather than for attempts to obtain majorities in postal card votes, for surely the quiet deliberations of a few representatives selected because of their long experience in the intricacies of a very intricate subject are more likely to reduce confusion than is the conclusion of a large number of persons, voting upon a subject perhaps by mail and assuredly with less careful deliberation.

(77) This latter point was clearly recognized in the Cambridge (England) meeting when the commission was not, because of a lack of unanimity in its report, even accorded a place on the program to present the rules, and again in the Berlin congress when the commission was urged to keep the subject of nomenclature out of the general meetings by reporting only upon propositions agreed upon by unanimous vote in commission.

(78) *The Relations of the Commission to the Congress.*—Certain letters and certain published criticisms seem to indicate more or less clearly that there is considerable misunderstanding in regard to the relationship of the commission to the congress. In the hope of clearing up certain points and thus in the hope of a better understanding, the commission ventures to give a brief statement bearing on this subject.

(79) In 1889 and 1892, at the Paris and the Moscow congresses, a code of zoological nomenclature was discussed and adopted.

(80) In 1895, at the Leiden congress, a desire was expressed by one of the German delegates to have all codes submitted to a comparative study and to have the results presented to the next congress. As a result, a commission of five members was appointed to carry out this task. This commission worked for three years and was prepared to present its report to the Cambridge congress of 1898, but because of the fact that this report was not unanimous on all points, the commission was refused a place on the program for the presentation of its conclusions as to the rules. The commission was, however, increased to 15 members in the hope of reaching more satisfactory results in its vote, and upon motion the general session voted that all propositions that were to be reported upon at any given congress were to be in the hands of the commission at least one year prior to the meeting of the congress.

(81) After another period of three years' work, during which the enlarged commission had to restudy the entire report of the original commission, the former met at Berlin in 1901. Before its report was completed conferences were held with quite a number of the more prominent members of the congress. During these conferences the commission was given very distinctly to understand that the congress would not receive any report unless it was unanimous. As one prominent German member of the congress stated *in effect:* "It is the duty of the commission to become unanimous in its vote; give us a definite set of rules, good, bad or indifferent, but be unanimous in your report, and after you give us the rules, see that they are carried out." The words of this prominent German savant were a fair reflection of the feeling we found at the Berlin meeting, so far as the secretary of the commission could discover.

(82) Unfortunately the Commission could not

agree upon all points, and after many conferences, it finally suggested to the congress the proposition that those portions of the rules upon which the commission was unanimous should be accepted, and that all other portions be referred back to the commission. This motion, suggested in the general session, prevailed.

(83) After its experience at Cambridge and Berlin the commission was indeed not inclined again to repeat its action of preparing for the congress (as it did at Cambridge) any proposition unless all of its members present at the congress were unanimously agreed upon it. In order to make this point certain the commission adopted at the Berne congress the principle of reporting recommendations in regard to changes in the rules, only when the vote upon them was unanimously in the affirmative. Since the Berne congress this plan has, in the interest of conservatism, been strictly adhered to. From the Berlin congress in 1901 until the present congress, no section on nomenclature has been provided by the program committee and the commission has endeavored to meet this situation by holding an open meeting of the commission which all persons interested in nomenclature were invited to attend.

(84) The history of the commission has clearly demonstrated that the congress has thus far desired not to have its general meetings turned into open discussions on questions of nomenclature, but rather to have nomenclatorial discussions confined to sections and commissions and nomenclatorial questions decided in committee.

(85) If at present there is a change of desire on the part of the congress and if the congress wishes these very technical and complex matters discussed in the general sessions, the commission would rejoice at the more general interest in nomenclature as evidenced by such a desire, but at the same time it is constrained to state that nomenclature is a subject that requires quiet deliberation rather than formal debate, and, further, that to throw open the general meetings of this congress as a forum for this exceedingly dry and complicated subject will be not only to jeopardize the success of future congresses, but, since this plan is not in accord with the plan under which many zoologists elected to follow the international rules, a grave question arises as to following such a policy.

(86) *Amendments to the "Règles Internationales de la Nomenclature Zoologique."*—There have been fifteen series of amendments submitted to the commission which has been in session since Friday, March 22, studying the various suggestions, giving hearings, etc. For instance, a special hearing was given both to Professor Brauer and to Dr. Poche for presentation of any arguments or points of view they might desire to submit in connection with the proposed amendments in which they were especially interested.

(87) A somewhat embarrassing situation presented itself because of the unusually early date of the congress, but a valid parliamentary method was suggested under which it became possible to consider all of the propositions submitted.

(88) Departing from the usual custom, the secretary had published in the *Zoologischer Anzeiger*, November 26, 1912, and March 11, 1913, all propositions that had reached him and in addition several propositions that were known to him by fact of their publication.

(89) Under the by-laws adopted by the commission, and published for general information in the last report, the commission proceeds as follows: Under Art. IV., Section 1(*a*) the commission reports to the congress "Recommendations involving any alteration of the 'Règles Internationales de la Nomenclature Zoologique,' but no such recommendation is to be reported unless it has first received a majority (8) vote of the commission and the unanimous vote of all commissioners present at the meeting."

(90) In accordance with this by-law, the commission herewith reports upon the following amendments with the recommendations that they be inserted in their proper place in the Règles.

(91) (*a*) Suggested amendment No. 9, submitted by the First International Entomological Congress, has been modified slightly by the commission, and is reported in the following form as a *Recommendation:* "It is recommended that in published descriptions of new species or new subspecies, only one specimen be designated and labeled as *type*, the other specimens examined by the author at the same time being *paratypes.*"

(92) (*b*) Suggested amendment No. 13, submitted by J. A. Allen and T. D. A. Cockerell.—After considerable discussion, the commission voted that the first portion of the proposed amendment (concerning *Gavia, Fregata* and *Piccoides*) and the first portion of the second paragraph (concerning *Plautus*) are already covered by the Règles as interpreted by opinion 46.

(93) The idea also obtains for at least a portion of suggested amendment No. 1, that the points in question are provided for in the code, and a formal opinion to this effect is now contemplated.

(94) *The Law of Priority.*—The law of priority has been affirmed by a number of zoological codes, and has been formally affirmed twice (1892 and 1901) by the International Congress of Zoology. The original code of 1889 and 1892 permitted certain exceptions to this law. Contrary to the very earnest appeals of the president and the secretary of the commission, the section on nomenclature in the Berlin congress adopted the view that these exceptions should be eliminated and in said section the view obtained that the law of priority should be rigidly enforced *without any exceptions of any kind in any group.* When the matter came to argument in the commission, the president and the secretary after a long discussion and with many misgivings, finally, for the sake of harmony accepted the will of the majority, but this was not until after they had received positive assurance from prominent members of the congress that the commission would be supported in its attempt to carry out the amended law, for which, in the minds of the president and the secretary, the zoological profession was not then prepared. Clearly foreseeing at that date the tremendous dissatisfaction that the amended law would cause, in a profession not all of whose members are accustomed to dealing with a large number of names, the president and the secretary of this commission immediately, in part even before adjournment of the Berlin congress in 1901, made preparations to meet the discontent which to their minds was inevitable as a result of the action taken at the Berlin congress. This discontent has now culminated in the presentation to the commission of several propositions which have for their purpose the authorization of exceptions to the law of priority. From the fact that the several propositions submitted to the commission before this congress convened, and no less than four substitute propositions submitted formally or suggested informally during the present work, are very different in character, the commission is persuaded that the adherents of the policy of making exceptions to the law are far from being in accord as to the method that should be adopted. From the fact that memorials, protests, resolutions, letters, etc., both for and against the plan of exceptions have reached the commission evidence is clear that the conclusions of the International Congress of Zoology held in Berlin, Germany, are still subject to a considerable difference of opinion. The commission does not see its way clear to accept the postal card votes that have been taken as representing a sound basis upon which its decision must be made, but incidentally it may be mentioned as a matter of more or less general interest that more persons have protested to the commission against changing the rules by admitting exceptions than have asked that exceptions be made. The interpretation the commission places upon the two votes is that there is a tremendously increased interest on both sides of the subject and that there are many zoologists who feel the same inconveniences that the commission has felt ever since its organization and the same inconveniences that all zoologists have felt who have tried to consistently apply the law.

(95) Admitting without any reservation the point that the commission itself feels very keenly the inconveniences of the law, even claiming in fact that the original commission of 1895 was in favor of certain exceptions as evidenced by its report, the present personnel of the commission, whatever may be its views as to the wisdom of the action taken in Berlin, stands in overwhelming majority against admitting to the code any provision looking to exceptions to this long-established rule.

(96) The administrative office of the Deutsche Zoologische Gesellschaft, through a statement published (*Zool. Anz.*, March 11, 1913) as official by its secretary gives its view to the effect that decision on this matter should be reached during the present congress and that this decision can not be postponed for three years; furthermore, a number of members of the congress have expressed the view to the effect that this subject must now be settled definitely, finally and once for all, so that they may proceed in their work undisturbed by vacillations in the rules.

(97) So far as the question concerns the commission, the matter may be viewed as settled; and if this matter, at least in its present form, come before any future congress it will be because of the changes in the commission's personnel that occur by death, resignation and expiration of terms of service, or because it is forced upon the commission by circumstances.

(98) In this report it has been unreservedly stated that the law of priority is a harsh law and produces inconveniences. It has also been stated that the president and the secretary of the commission, when defeated in the Berlin congress in attempt to make this law somewhat milder, immediately laid plans with a view of possibly meeting the situation in some other way. The general plan discussed by them after their defeat in Berlin in 1901 has been constantly held in reserve to be

presented when the proper time should come. It is this plan, in slightly modified form, that the commission presents to the congress as basis for an attempt to relieve zoologists, more especially teachers, of at least some of the inconveniences of which complaint is made. That this plan does not go far enough to suit some members of this congress is so self-evident that it need not even be admitted. It is, however, the unanimous opinion of the commission as assembled in Monaco, that this is the most feasible method in view by which this work may be inaugurated. Prior to giving the plan in detail, it may be stated that the secretary of the commission has asked a number of zoologists to give a rough estimate as to the number of names for which exceptions were desired and also the number of names in the working vocabulary of the average zoologist other than systematists. The estimates in reply to the first question varied exceedingly, one man placing it as low as 20, others as high as 600; the estimate in reply to the latter question, as to vocabulary, usually varied from 300 to 600, although one man placed it at 1,000. This highest estimate, namely, 1,000 names, is taken as present numerical basis in the suggestion here made, namely, the adoption of the following resolution:

(99) Whereas, It is claimed that during the transitional period in nomenclature when the names are being reduced to a consistent, uniform and objective basis, hardships result to many zoologists, especially to teachers, because of the changes involved, therefore, be it

(100) *Resolved,* That the Ninth International Zoological Congress establish an "International Committee on Transitional Names," as follows:

1. No person is eligible to serve at the same time as a member of the International Commission of Zoological Nomenclature and on this new committee.

2. Said committee is to be composed of 15 zoologists who shall have power to organize in such manner as they may deem wise.

3. Said committee is empowered to select 1,000 (and no more) zoological names, in such manner and with such aid from other zoologists as the committee may desire, and is instructed definitely to define the meaning of the names selected.

4. Said list of 1,000 names is to be known as the "Transitional List" and it shall be considered proper during the transitional stage of nomenclature of any given group, for any author to use any of said names, even though they be not in accord with the law of priority.

5. All authors making use of the Transitional List are urgently requested to designate the name by a dagger (†) or by such other sign as the committee may select, in order to signify that they are using the names in the sense of the list.

6. As soon as both the International Commission of Zoological Nomenclature and the International Committee on Transitional List vote independently by a two thirds majority that the time has come in the nomenclature of any group to drop any given name or names from the Transitional List, joint report to this effect is to be made to the International Congress and the name or names in question are then to be removed from the Transitional List.

(101) *Resolved,* That this action is not to be interpreted as in any way restricting the application of the law of priority or of any other provision in the rules of nomenclature.

(102) Incidentally it may be stated that the commission has for some time had under informal discussion the advisability of a resolution by the congress placing in the hands of the commission the plenary power of suppressing entirely, in some way, certain names which it is claimed are at present applied in an erroneous sense and which when transferred to the correct genus or species under the law of priority are calculated to produce unusual confusion. As yet the views of the commission are not formulated in a sufficiently safeguarded manner to make it advisable to report definitely on the subject at the present congress. [See below, Supplementary Report.]

(103) Although the resolution as reported places in the hands of the proposed Committee on Transitional List unrestricted power as to the selection of the names, this point does not raise any misgivings in the mind of the commission. Furthermore, the resolution gives to the committee in question unrestricted privilege of inviting cooperation and it safeguards the list by requiring a two thirds majority in order to eliminate names from the list.

(104) In reference to the personnel of the new committee, the commission presents the following resolution:

(105) *Resolved,* That, for purposes of organizing, the initial members of the Committee on Transitional List shall be: Professor Brauer (secretary of the Deutsche Zoologische Gesellschaft), Dr. Mortensen (of Copenhagen) and Dr. Williston (of the University of Chicago); and

(106) *Resolved,* That these men be authorized

and instructed to complete the personnel of the committee.

(107) *A New Edition of the Code.*—The commission recommends to the congress the insertion into the proceedings of the present congress a copy of the revised code of rules, and that the summaries of opinions be printed in the appendix.

(108) Signed in name of commission.

C. W. STILES,
Secretary

(109) SUPPLEMENTAL REPORT

[(110) After the foregoing report was prepared, an additional proposition was submitted to the commission that had been adopted by the Section on Nomenclature. This proposition, however, after presentation of the foregoing and this supplemental report, the section voted to reconsider and upon such reconsideration the section approved in its place the resolutions presented in this supplemental report.—C. W. S.]

[(111) In presenting this supplemental report, the secretary made a verbal statement to the effect that these resolutions were not completed until after the foregoing report had been adopted by the commission, hence they could not be included in the regular report. They were in fact not completed until the morning of the last day of the congress. Prior to the meeting of the Section on Nomenclature, most of the members of the commission had approved the resolutions, and the section took a recess in order to permit the other commissioners to consider them. All commissioners approved the resolutions and the secretary was instructed to present them to the section and the congress as a supplemental report. From a parliamentary point of view, they are accepted by the commission as addition to the subject discussed in paragraph (102) of the report and as substitute for several of the proposals that had been presented as amendments to the code. The subject matter was first presented to the commission during its Gratz meeting, and since that time has been under more or less consideration. It was discussed during the Monaco (1913) meeting of the congress, but the form of the proposition was not agreed upon until immediately prior to its presentation at the joint session of the commission and of the Section on Nomenclature.—C. W. S.]

(112) The commission unanimously recommends to the congress the adoption of the following resolutions:

(113) *Resolved,* That plenary power is herewith conferred upon the International Commission on Zoological Nomenclature, acting for this congress, to suspend the Règles as applied to any given case, where in its judgment the strict application of the Règles will clearly result in greater confusion than uniformity, *provided,* however, that not less than one year's notice shall be given in any two or more of the following publications, namely, *Bulletin de la Soc. zoologique de France, Monitore zoologico, Nature,* SCIENCE (New York) and *Zoologische Anzeiger,* that the question of possible suspension of the Règles as applied to such case is under consideration, thereby making it possible for zoologists, particularly specialists in the group in question to present arguments for or against the suspension under consideration; and *provided,* also, that the vote in commission is unanimously in favor of suspension; and *provided* further that if the vote in commission is a two thirds majority of the full commission, but not a unanimous vote in favor of suspension, the commission is hereby instructed to report the facts to the next succeeding International Congress; and

(114) *Resolved,* That in the event that a case reaches the congress, as heretofore described, with a two thirds majority of the commission in favor of suspension, but without unanimous report, it shall be the duty of the president of the Section on Nomenclature to select a special board of three members, consisting of one member of the commission who voted on each side of the question and one ex-member of the commission who has not expressed any public opinion on the case, and this special board shall review the evidence presented to it and its report, either majority or unanimous, shall be final and without appeal, so far as the congress is concerned; and

(115) *Resolved,* That the foregoing authority refers in the first instance and especially to cases of the names of larval stages and the transference of names from one genus or species to another; and

(116) *Resolved,* That the congress fully approves the plan that has been inaugurated by the commission of conferring with special committees from the special group involved in any given case, and that it authorizes and instructs the commission to continue and extend this policy.

ACTION OF THE SECTION ON NOMENCLATURE AND OF THE CONGRESS ON THE FOREGOING REPORTS

At the Saturday morning session of the Section on Nomenclature the chairman gave the floor to the secretary of the Commission on Nomenclature. The secretary invited attention to the fact that the

by-laws of the commission provided for an open meeting of the commission, and he moved that the present session of the section resolve itself into a joint meeting of the commission and of the section, in order to comply with the provision in question. Upon second, this motion prevailed.

The secretary reported that he was under instructions from the commission to present to the meeting the report and a supplemental report of the commission. The chair called for the reports which were read in full, except that upon motion, second and vote, he read paragraphs (31–45 and 58) by title, or by title and examples.

Following the reading of the regular report, the meeting took a short recess to enable certain members of the commission to examine and vote on the supplemental report. After the meeting was again called to order, the supplemental report was read.

The secretary requested the adoption of the reports as a whole, explaining that this adoption did not carry with it the approval of the separate recommendations. Upon motion, and second, the reports were adopted.

The secretary requested action on those paragraphs that involved recommendations, nominations and resolutions. Acting upon each subject separately, the joint meeting, upon motion and second *approved* the following paragraphs separately:

(5), (9), (11), (13), (14), (50) [commission instructed to continue the list], (52 *a*, *b*, *c*) [vote unanimous except for one], (55), (56), (57), (91), (107), (113), (114), (115), (116).

The secretary was asked if it would be agreeable to him to resubmit the names in (31), (32), (33), (34), (35), (36) and (37) to subcommittees of specialists before they were formally approved. His reply was that the suggestion was entirely agreeable, and he withdrew his request for formal approval of these lists.

The secretary gave notice that the list of bird genera in (38) would be published before action was taken by the commission.

No formal action was asked upon (40), (41), (42), (43), (44), (45).

In view of the fact that opinions 29–51, inclusive, had been printed in detail, it was moved, seconded, and voted that the section (58) of the report dealing with opinions 29–56 be read by title, and that the opinions be approved.

Commissioner Stejneger stated that he now had some misgivings as to whether or not practical difficulties might arise in coordinating the resolutions of paragraphs (99), (100), (101), (105), (106) with (113), (114), (115) and he requested that action on the former be postponed until the next congress, in order to determine more clearly whether the two propositions contained anything of a contradictory nature. As any one commissioner has a right to cause postponement of action on any portion of the report (since the commission's vote must be unanimous), Dr. Stejneger's request was respected and no final action was taken in regard to the Transitional List; these sections were tabled.

In reply to certain questions, the secretary explained the following English parliamentary expressions:

"*To table*" or "to *lay on the table*" any motion means that final action is postponed upon the matter in question. Matters that are "tabled" may be "*taken from the table*" for further consideration and for final action.

The expression "*suspend* the Règles" in the supplemental report is used in its accepted parliamentary sense. Parliamentary procedures are carried out under recognized or special "parliamentary rules" and under provisions contained in "constitutions" and "by-laws." Upon a unanimous vote, by-laws may be temporarily "suspended," that is to say, they may be set aside and the body takes action on the matter under consideration unrestricted by the provisions of the by-laws, and such action, if taken under a "special rule" framed for the case at hand or without reference to any rules, except the "constitution" and recognized "parliamentary rules," has all the validity of an action taken under the "by-laws."

Thus, if the congress confers upon the commission the plenary power to suspend the Règles in any given case, it practically says to the commission: "If you carry out the precautions provided for in the supplemental report, you may decide any given case arbitrarily without reference to the Règles or you may make a "special rule" to govern that particular case, and this congress will accept your decision as being just as authoritative as if you had made your ruling strictly in accord with the code." A plan of this kind is thoroughly in accord with recognized parliamentary customs and it has the great advantage of saving the necessity of introducing "exceptions"[1] to the rules.

[1] To make this point as to the difference between "exceptions" and "suspension" of rules clearer to some of the non-English-speaking members, the secretary later used this comparison upon adjournment of the meeting:

In reply to a question, the secretary stated that a number of special committees had been formed, consisting of specialists in various groups, and that the general policy had been adopted to confer with these committees upon questions and cases affecting their particular groups. Despite the experience that this method added greatly to the routine of the secretary's office, he felt the policy should be not only continued, but also extended, and he was willing to accept, without confirmation by the section, any special committees chosen by any general committees appointed for that purpose.

In conclusion, the secretary invited attention to the fact that during part of the meeting the secretary of the section had been obliged to be absent from the session, and he therefore moved that the edited copy of the reports, with his marginal notes as to action taken, be accepted as the minutes of the joint meeting. Upon second, this motion prevailed.

C. W. STILES,
Secretary of Commission

At the afternoon general session, the secretary of the commission reported in English upon the resignations, nominations, amendments and resolutions, recommended by the commission, and approved by the Section on Nomenclature, but he did not read the report in full.

The president of the commission gave a résumé of the subject in French, translating most portions of the resolutions verbatim, and adding certain explanatory remarks.

All matters involved were voted upon by the general session, *en bloc* and without discussion (which it had been decided should be confined to the meeting of the section). Against only four dissenting votes, all the subject matter in question was adopted and approved.

C. W. STILES,
Secretary of Commission

APPROPRIATIONS FOR THE UNIVERSITY OF ILLINOIS

ON June 24 Governor Dunne signed senate bill 675 carrying an appropriation of $4,500,000 for the University of Illinois for the biennium 1913–1915.

A correspondent writes:

The signing of this bill by Governor Dunne is one of the most important events in the history of higher education in Illinois.

First of all the passing of this bill indicates that the legislature approved by an overwhelming vote the mill tax for the university which was passed by the preceding legislature, so that all the leading parties, democrats, republicans, progressives and socialists, have endorsed this policy with unanimity. It indicates, too, the high-water mark of the whole history of educational development in the state.

In the second place it marks an epoch on account of the particular form in which the bill was passed since it leaves to the judgment of the board of trustees, within certain broad lines, the use of funds in the development of the institution and puts a stop to tendencies shown in nearly all legislatures to interfere unduly with the management of the institution by itemizing appropriations which have the effect often of thwarting the very purpose for which they were given.

The people of the state are to be congratulated that the university has never entered into politics and that all parties have had an active part in its development. The university was founded under a republican administration, but it was in the régime of a democratic governor—Governor Altgeld—that it received its first large appropriation. It was a republican administration that passed the mill tax, but a democratic one that has made it permanent and initiated a new form of passing the appropriation that marks a new era in the institutional development.

The present legislature has definitely settled another important question—one upon which for years there has been much discussion. In the university bills that were first introduced this year there was an item calling for $100,000 a year for the support of medical education. A determined

"It would be dangerous to make a law read:

"'Theft shall be punished by imprisonment for one to ten years, *except* in such cases where the thief has tuberculosis.' But justice is tempered with mercy if one law reads:

"'Theft shall be punished by imprisonment for one to ten years,' and if another law reads:

"'The President (or the King) is empowered to *suspend* punishment in certain cases in which, in his judgment, a feeling of humanity demands such a suspension.'

"Suppose, now, it is shown that a thief, who is sentenced to ten years imprisonment, is about to die of tuberculosis; even if the sentence is passed upon him, the President (or the King) could parole or pardon the man in order to permit him to go home to die."

attempt was made in the senate to amend the bill to the effect that no cent of the appropriation should be used for the support of a medical college. The amendment was turned down by a vote of 34 to 9. A similar amendment in the house was defeated by the decisive vote of 94 to 37.

The trustees, therefore, who are chosen by the people, are left with the authority to spend $100,000 more or less, as it may in their best judgment seem wise, for the support of medical education. There is every reason to think that the trustees will be conservative in the carrying out of the duties entrusted to them by the people of Illinois.

SCIENTIFIC NOTES AND NEWS

Dr. Victor C. Vaughan, professor of hygiene and physiological chemistry in the University of Michigan, and dean of the department of medicine and surgery, was elected president of the American Medical Association at the recent Minneapolis meeting.

At the closing session of the meeting in Minneapolis of the Society for the Promotion of Engineering Education, Dean Anthony, of the Tufts Engineering School, was elected president. The next annual meeting will be held at Princeton, N. J.

The Cannizzaro prize of $2,000, founded by the late Dr. Ludwig Mond, has been awarded by the Accademia dei Lincei, of Rome, to Mr. Frederick Soddy, F.R.S., lecturer in physical chemistry at the University of Glasgow, for his researches in radioactivity.

The University of Michigan has conferred the doctorate of laws on Dr. Roscoe Pound, professor in the Harvard Law School, the author of contributions to plant geography, and the degree of doctor of public health on Surgeon General Rupert Blue.

Professor Alfred E. Burton, professor of topographic engineering at the Massachusetts Institute of Technology and dean, has been given the degree of doctor of science by Bowdoin College, from which he was graduated in 1878.

The University of Cincinnati has conferred upon Dr. L. A. Bauer, of the Carnegie Institution, the degree of doctor of science.

The University of Pennsylvania has conferred the degree of doctor of science on Mr. Witmer Stone, curator of the Academy of Natural Sciences of Philadelphia and editor of *The Auk*.

The University of Vermont has conferred the degree of doctor of science on Mr. Chas. A. Catlin, chemist of the Rumford Chemical Works, Providence, a graduate of the university in 1872.

Dr. William J. Mayo, of Rochester, Minn., has been elected foreign correspondent of the Academy of Medicine in Paris.

Professor Dmitri Petrovitsch Konovaloff, of St. Petersburg, and Professor Alfred Werner, of Zurich, have been elected honorary foreign members of the Chemical Society of London.

Professor S. A. Mitchell, of Columbia University, has been appointed director of the Leander McCormick Observatory at the University of Virginia, as successor to Professor Ormond Stone. During the past year Dr. Mitchell has been on sabbatical leave from Columbia and has spent his time at Yerkes Observatory in the photographic determination of stellar paradox and in spectrographic investigations of motion in the line of sight.

The board of scientific directors of the Rockefeller Institute for Medical Research announces the following appointments and promotions: The following assistants have been made associates: Frederick Burr LaForge, Ph.D. (chemistry); James Bumgardner Murphy, M.D. (pathology and bacteriology); Gustave Morris Meyer, Sc.D. (chemistry), and Martha Wollstein, M.D. (pathology and bacteriology). Michael Heidelberger, Ph.D., has been promoted from fellow to assistant in chemistry. The following new appointments are announced: Wade Hampton Brown, M.D., associate in pathology and bacteriology; Carroll G. Bull, M.D., assistant in pathology and bacteriology; Frederick Lamont Gates, M.D., fellow in physiology and pharmacology. Dr. G. Canby Robinson, formerly associate in medicine, has been appointed associate professor of medicine at Washington University,

St. Louis. Dr. Jacques J. Bronfenbrenner, formerly assistant in pathology and bacteriology, has been appointed director of the pathological laboratory of the Western Pennsylvania Hospital, Pittsburgh. Dr. Richard Vanderhorst Lamar, formerly associate in pathology and bacteriology, has been appointed professor of pathology at the University of Georgia.

PROFESSOR ROBERT R. BENSLEY, of the department of anatomy in the University of Chicago, has been made one of the editors of the *Internationale Monatsschrift für Anatomie und Physiologie,* published in Leipzig.

DR. GEORGE FAY GRACEY, professor of chemistry and toxicology in the University of Texas, has resigned to enter practise in New York as a specialist on diseases of the eye.

H. N. CONOLLY, formerly field agent in horticulture of the Alabama Polytechnic Institute, has accepted a position in the United States Department of Agriculture, Bureau of Plant Industry.

MR. A. R. HINKS, F.R.S., chief assistant at the Cambridge Observatory, and university lecturer in surveying and cartography, has been appointed assistant secretary of the Royal Geographical Society.

MR. L. G. HUNTLEY, of the Associated Geological Engineers, is at present engaged in a study of the Pelican Portage gas field and other localities in central Alberta for the city of Edmonton.

FREDERICK ANDEREGG, professor of mathematics at Oberlin College, has been granted a year's leave of absence, for study and travel in Europe.

MR. PAUL C. MILLER and Mr. M. G. Mehl have returned from a two-months' expedition in the Red Beds of Texas, the fourth into that region by the paleontological department of the University of Chicago.

MR. G. N. WOLCOTT, who is the traveling entomologist supported by the Porto Rico Sugar Growers' Association, is collecting parasites of the white grub, to introduce into Porto Rico, where the white grubs are a very serious pest in the cane fields. Mr. Wolcott has his chief headquarters in the United States at the University of Illinois.

DR. W. D. MAWSON, who is in charge of the Australasian Antarctic Expedition, which is now working on the Antarctic continent, south of Australia, has sent a wireless message to Professors David and Haswell, of Sydney, asking them to arrange for Mr. E. R. Waite, curator of Canterbury Museum, Christchurch, New Zealand, to report on the fishes of the expedition. Last year Mr. Waite joined Dr. Mawson's vessel, the *Aurora,* in an exploring expedition in the Southern Ocean, touching at the Macquarie and Auckland Islands, and obtained a number of specimens of fishes. He is now working on these, and further specimens will be sent to him from Adelie Land. Mr. Waite also reported on the fishes for Sir Ernest Shackleton's expedition in the *Nimrod.*

A STATUE of Lord Kelvin was unveiled on June 19 in the Botanic Gardens, Belfast. The chancellor of the Queen's University, Belfast, the Earl of Shaftesbury, presided and Sir Joseph Larmor, M.P., F.R.S., delivered an address. The statue is the work of Mr. Bruce Joy. We learn further from *Nature* that the statue of Lord Kelvin erected by the contributions of his fellow-citizens in Glasgow and the west of Scotland has been placed in position by the side of the new Kelvin Avenue, which traverses the Kelvingrove Park beneath Gilmorehill, close to the University of Glasgow. The statue will be unveiled on October 8 next, by the Right Hon. A. Birrell, lord rector of the university, and an address on Kelvin will be delivered by the Right Hon. A. J. Balfour, Gifford lecturer in the university. The Kelvin memorial window in Westminster Abbey will be unveiled on July 15.

AT the twenty-fifth reunion of the class of 1888 of Washington and Jefferson College, on June 17, a library memorial fund was established in honor of Dr. Jesse W. Lazear, U.S.A., a member of the class, who left before graduation to study medicine and who afterward became a member of the commission to investigate the rôle of the mosquito in the trans-

mission of yellow fever, and sacrificed his life to the cause of scientific research.

Professor N. H. Alcock, professor of physiology in McGill University and the author of important contributions to this science, has died at the age of forty-two years.

Dr. Forbes Winslow, who founded the British Hospital for Mental Disorders and was the author of numerous works on insanity, has died at the age of seventy years.

Sir Jonathan Hutchinson, a prominent London surgeon, died on June 23, aged fifty-four years.

The University of Montana Biological Station will be open from June 17 until September 1, under the direction of Dr. Morton J. Elrod, head of the department of biology. The laboratory is located on the east shore of Flathead Lake, at an altitude of 2,900 feet, in a tract of 87 acres of virgin forest donated by congress. Two other tracts of 40 acres each are on islands but a few miles distant. The Mission range of mountains come quite abruptly to the lake at the station, rising to an elevation nearby of 8,500 feet. A few miles to the south the elevation is 10,000 feet. The lake is 30 miles long and at the middle, where the station is located, it is 19 miles wide. It covers nearly 400 square miles, has a shore line of almost 150 miles and is 300 feet deep. Up the lake from near the station a fringe of fruit ranches borders the lake. Down the lake and for many miles beyond, the country is an unsettled forest. Eastward the unbroken forest extends across range after range until the plains country is reached beyond the main divide. The station was established in 1899, and has continued with an interruption of two years. Its former location was at Bigfork, where Swan River enters the lake at the upper end. Last year a building was erected. This is a two-story brick structure, capable of accommodating about 25 workers. The staff and workers live in tents, and meals are provided at a mess table. The facilities for work are extended to elementary and advanced students and to investigators. Those attending the station may take such work as they please within certain limits, and all the assistance possible will be rendered them. The field method is largely employed. Courses will be offered in botany, zoology, ecology, physiography, ornithology, entomology, photography and plankton, besides the facilities offered for research.

According to an advance statement by Ernest F. Burchard, of the United States Geological Survey, the total quantity of Portland, natural and puzzolan cements produced in the United States in 1912 was 83,351,191 barrels, valued at $67,461,513, compared with 79,547,958 barrels, valued at $66,705,136, in 1911. This represents an increase in quantity of 3,803,233 barrels, or 4.78 per cent., and in value of $756,377, or 1.13 per cent. The distribution of the total production among the three main classes of cement in 1912 is as follows: Portland, 82,438,096 barrels, valued at $67,016,928; natural, 821,231 barrels, valued at $367,222; puzzolan, 91,864 barrels, valued at $77,363. The total production of Portland cement in the United States in 1912, as reported to the United States Geological Survey, was 82,438,096 barrels, valued at $67,016,928, compared with 78,528,637 barrels, valued at $66,248,817, in 1911. The output for 1912 represents an increase in quantity of 3,909,459 barrels, or nearly 4.98 per cent., and in value of $768,111, or 1.13 per cent. The shipments of Portland cement from the mills in the United States in 1912 are, according to reports received by the survey, 85,012,556 barrels, valued at $69,109,800, compared with 75,547,829 barrels, valued at $63,762,638, shipped in 1911. The shipments therefore represent an increase in quantity of 9,464,727 barrels, or 12.52 per cent., and in value of $5,247,162, or 8.38 per cent. The average price per barrel in 1912, according to these figures, was a trifle less than 81.3 cents, compared with 84.4 cents in 1911. This represents the value of cement in bulk at the mills, including labor and cost of packing, but not the value of the sacks or barrels. The average price per barrel for the country is about 13.9 cents higher than the average price received for Portland cement in the Lehigh district, where it was sold at the

cheapest rate, and is near the average price received in the Iowa-Missouri district, but it falls 54.5 cents below the average price received on the Pacific coast, where Portland cement brought the highest figure during the year.

UNIVERSITY AND EDUCATIONAL NEWS

THE University of Chicago has received $300,000 for a building to be used as a social center and gymnasium for the women of the university. The donor is Mr. La Verne Noyes. The building is to be a memorial to his deceased wife and will be known as the Ida Noyes Hall.

AT the recent commencement at Smith College, it was announced that the trustees had appropriated the sum of $140,000 for the construction of a new biological building.

DR. E. P. LYON, professor of physiology and dean of the Medical College of St. Louis University, has been appointed dean of the medical department of the University of Minnesota and director of the physiological department.

CHARLES S. WILLIAMSON, JR., associate professor of chemistry in the Alabama Polytechnic Institute, has accepted an associate professorship of industrial and sugar chemistry in Tulane University.

F. E. CHIDESTER, Ph.D. (Clark), instructor at Rutgers College, has been advanced to the position of assistant professor of biology.

THE department of zoology at Oberlin College will be enlarged during the coming year by the addition of Professor Charles G. Rogers, formerly of Syracuse University.

PROMOTIONS and new appointments at the Johns Hopkins University include the following: In the philosophical faculty: J. Elliott Gilpin, Ph.D., now associate professor, to be collegiate professor of chemistry; Duncan S. Johnson, Ph.D., now professor of botany, to be professor of botany and director of the Botanical Laboratory and the Botanical Garden; Burton E. Livingston, Ph.D., now professor of plant physiology, to be professor of plant physiology and director of the Laboratory of Plant Physiology; Edward W. Berry, now associate in paleobotany, to be associate professor of paleontology; Joseph T. Singewald, Jr., Ph.D., now Henry E. Johnston scholar, to be associate in economic geology. In the medical faculty: Leonard G. Rowntree, M.D., now associate, to be associate professor of experimental therapeutics; Warren H. Lewis, M.D., now associate professor of anatomy, to be professor of physiological anatomy; E. V. Cowdry, M.D., of the University of Chicago, to be associate in anatomy; Dr. Paul G. Shipley, of Yale University, and Dr. George Corner, to be assistants in anatomy.

FOLLOWING the creation of the new office of chancellor at Leland Stanford Junior University to be filled by Dr. David Starr Jordan and the appointment of Dr. J. C. Branner, to the office of president, Dr. John Maxson Stillman, head of the department of chemistry, has been made vice-president. The following promotions and appointments in the university faculty have been made: In the sabbatical absence of Professor H. W. Stuart, in philosophy, Professor Warner Fite, of the University of Indiana, has been elected acting professor for the first semester. Assistant Professor George Holland Sabine, in the same department, has been made associate professor. In economics, Instructors Stephen Ivan Miller and Donald Frederick Grass have been made assistant professors. In graphic art, H. V. Poor has been appointed assistant professor. In mathematics Associate Professor H. F. Blichfeldt has been made professor, and Assistant Professor W. A. Manning, in applied mathematics, has been made associate professor. Instructor L. E. Cutter, in mechanical engineering, has been made assistant professor. In physiology, Instructor F. W. Weymouth has been made assistant professor. In medicine, Assistant Professor Thomas Addis has been made associate professor, and Instructor E. D. Congdon has been made assistant professor. Instructor Leo Eloesser has been made assistant professor of surgery.

AT Birmingham University Professor W. S. Boulton, professor of geology at University

College, Cardiff, has been appointed to succeed Professor C. Lapworth, F.R.S., who retires at the close of the present year.

Professor Abderhalden goes to Vienna as the successor of Professor Ludwig, to take charge of the Institute for Medical Chemistry.

A chair of exotic pathology has been established at the Collège de France. The assembly of the professors of the college has submitted for the choice of the ministry, Dr. Nattan-Larrier as their first choice and Dr. Tanon as their second choice for this chair.

DISCUSSION AND CORRESPONDENCE

SOME FACTS CONCERNING MENDELISM

In the *American Breeders' Magazine,* No. 1, Vol. 6, there is a short sketch of the life of Thomas Andrew Knight. Attention is drawn to the fact that Mr. Knight gave to the Horticultural Society of London, in 1823, the results of some experiments that he had carried on in cross breeding peas. Following this statement Mr. Knight's reason for using peas is given, and it is remarked as peculiar that he was using the same plants, as Mendel later did, in breeding experiments and discussing these experiments a year after Mendel was born. Consulting the original paper of Mr. Knight's in the proceedings of the Horticultural Society for 1823, a reference was found to another paper in the same volume of proceedings which was written in 1822, the year Mendel was born. The author of this second paper was Mr. John Goss. It seems that Mr. Goss had been cross breeding the Prolific Blue pea and a dwarf pea and had obtained some results which he thought worthy of publicity.

In part the article of Mr. Goss is as follows:

> In the summer of 1820 I deprived some blooms of the Prolific Blue of their stamina and the next day applied the pollen of a dwarf pea, of which impregnation I obtained three pods of seed. In the following spring when these were opened, in order to sow the seed, I found to my great surprise, that the color of the peas instead of being deep blue, like their female parent, was of a yellowish white, like the male. Toward the end of the summer I was equally surprised to find that these white seeds had produced some pods with all blue, some with all white, and many with both blue and white peas in the same pod.
>
> Last spring I separated all the blue peas from the white, and sowed each color in separate rows; and I now find that the blue produces only blue, while the white seeds yield some pods with all white, and some with both blue and white peas intermixed.

It would seem from the above that Mr. Goss had a great law within his hands, but because of the fact that the first three pods of seeds seemed to show direct effect of pollen he lost sight of the very thing that was later stated as a law, and continued his paper as a discussion of direct effect of pollen in the first impregnation.

Following immediately the paper of Mr. Goss's in the proceedings is a note by the secretary of the society referring to a communication of one Alexander Seton, Esq., which was read before the Society on August 20, 1822. It seems that Mr. Seton made a similar experiment to that of Mr. Goss, with the following results: Mr. Seton impregnated the Dwarf Imperial, a green variety of pea, with the pollen of a white, free-growing variety. From this pollination he obtained only one pod, which contained four peas, and which did not differ in appearance from the others of the female parent. The plants that grew from these four peas seemed to partake of the nature of both parents, being taller and more profuse than the Dwarf Imperial and less so than the male white parent, and the pods resembled those of the former, being short and having but few peas in each pod. On their ripening it was found that instead of their containing peas like those of either parent or of an appearance between the two, almost every one of them had some peas of the full green color of the Dwarf Imperial and others of the whitish color of the other parent. They were, however, found in undefined numbers in the pods, and all of the peas were completely of one color or the other, with none having an intermediate tint, as Mr. Seton had expected. Accompanying these two papers and opposite page 273 of volume 5 of the transactions of the Horticultural Society of London, pub-

lished in 1824, there is found a plate showing one of the pods produced by Mr. Seton. This colored plate shows two green peas and three white ones in the same pod.

It is interesting to note how close these men came, in the year of his nativity, to the law which later made Mendel famous.

T. H. McHATTON

COLLEGE OF AGRICULTURE,
UNIVERSITY OF GEORGIA

THE FOOD OF PLANTS

DR. BENEDICT in a recent number of SCIENCE opens the question regarding the definition of the word food as used by botanists.

That we need to come to some agreement is, I think, generally felt by teachers in all grades of the subject.

If we have in mind the plant's relation to substances outside of itself which may be taken and used in any of its vital processes, then carbon dioxide, water and minerals are food. This notion was suggested by the animal organism, which, however, is essentially unlike a plant in respect to immediate external relations. The term plant food arose to emphasize the importance of certain mineral constituents of the soil. Its use ignores the green plant's unique place in nature, and by implication even denies it.

If on the other hand we have reference to growth and repair of living tissue, carbon dioxide, water and minerals are waste products, the antithesis of food.

The question resolves itself into this, to which concept of the plant's activities is the concept food most nearly related? If the answer is nutrition then only such substances as can be oxidized in the tissues and energy thereby set free, are foods. To answer the question otherwise is not only to invite trouble from such a term as reserve food, but worse, make the whole subject of metabolism impossible of presentation. If we write the words "energy stored" and "energy set free" in the equations for photosynthesis and for respiration, the term food, in its commonly accepted sense is clear, and the term as applied to inorganic matter an absurdity. Nevertheless, the term plant food as applied to nitrate of soda, etc., is with us to stay, just as surely as oysters will continue to be known as shellfish.

It is our business to fit pedagogic methods to the facts and see that fundamental truths are clearly set forth regardless of how many qualifying terms we must employ.

I forbear quoting sentences from text-books in which the term food is used in opposite senses without explanation, thus by implication denying the importance of photosynthesis and ignoring the law of conservation of energy. Hypercriticism is born of pedantry, but consistency is a jewel. The agriculturist can not use our term fruit and we can not use his term plant food without contradiction and confusion. The trouble is not so much one of definition as of usage. A Frenchman who was learning English said: "When a horse goes rapidly you say he is fast, and when you tie him to the post he is fast. Your language is very difficult."

H. N. CONSER

UNIVERSITY OF MAINE,
May 27, 1913

A GOOD SOIL TUBE

GLASS tubes are generally used in soil physics laboratories when carrying on experiments on capillary rise and distribution of water in soils. To give the best results these must be one and one half to two inches in diameter, and are expensive and fragile. In student laboratories with class numbering 100 or more the writer has had an annual breakage of over 75 per cent.

During the past year a new style of tube has been used in the soil technology laboratories at the University of California. This form was suggested to the writer by Professor E. O. Fippin, of Cornell, and is in use there and in other laboratories.

The tubes consist of a wire-mesh cylinder, two inches in diameter and of the desired length, made by wrapping one fourth inch mesh wire netting around a form and riveting the edges at intervals of six or eight inches. Celluloid tubes made of thin transparent sheet

celluloid, cut in strips seven or eight inches wide, and rolled into cylinders, are thrust into the wire tube. This makes a cylinder that is soil-tight, transparent and durable. With reasonable use it will last several seasons, though the celluloid may crack or become scratched and opaque. They prove very satisfactory for capillary rise experiments and are excellent for studying distribution of water, as the inner tube can be withdrawn and unrolled, exposing the soil for easy sampling.

Charles F. Shaw
University of California

Lee's "Introduction to Botany"

To the Editor of Science: For a particular purpose I wish much to see a copy of James Lee's "Introduction to Botany," published in London in 1760, the first edition. I have inquired, but in vain, of all the large libraries in the United States, though all of them have later editions. Can any reader of Science tell me where a copy may be found in this country?

W. F. Ganong
Smith College,
Northampton, Mass.

The Leonhard Euler Society

It is well known that in 1909 the Swiss Naturforschende Gesellschaft resolved to publish the works of the extremely prolific and famous mathematician Euler. The estimated cost for the complete edition of over 40 large quarto volumes was supposed to be approximately $100,000 and was covered by about 400 subscribers (25 francs per volume, or $80,000 by subscription) and the so-called Euler-Fund resulting from contributions of governing bodies, scientific societies, industrial establishments and private persons.

So far six volumes have appeared and a seventh is in press. The work is apparently very carefully edited, and the typography is perfect.

Unfortunately the experience gained by the publication of the first volumes and the fact that a large number of additional papers and letters recently found among the documents of the Imperial Academy of St. Petersburg and in various other places will increase the total number of volumes show that the original estimate of cost is not nearly enough to guarantee a successful completion of the entire undertaking.

In order to partly meet an expected deficit of $40,000 it is proposed to found a *Leonhard Euler Society* with unlimited membership. The annual dues will be 10 francs (about $2) and membership is merely an honorary obligation to contribute to the success of a great scientific enterprise.

The originality and importance of Euler's writings, even at the present time, make it very desirable to have a uniform edition of all his works and it is so hoped that the appeal of the Swiss society will be generously answered by scientific circles.

Arnold Emch
University of Illinois

Scientific Books

Fixité de la Côte Atlantique de l'Amérique du Nord. By Douglas W. Johnson.

The quite harmonious interpretation of coast-level changes along the American Atlantic, made by scores of clean-witted and experienced observers through scores of years, are here briefly scrutinized and fundamentally contested. The supposed ups and downs of the Atlantic coast, which have been so carefully and abundantly recorded from Gaspé to the Carolinas, had promulgated a widely accepted notion that the North Atlantic seaboard was very uneasy, still undergoing warpings which might well have been in direct inheritance of its ancient Appalachian instability. Dr. Johnson's paper under the above title is not quite new, its date being rather more than a year back, but in these prolific and harlequin days of scientific ideas, it takes a little while for the leaven of reformation to register its effect. There are many excellent reasons for not taking grave exception to Dr. Johnson's general conclusion that the eastern American land is as a whole in fairly stable equilibrium—that is to say, is not now

in the act of swinging through the vertical secular period which the diastrophism of geological change calls for. Nevertheless, the first impulse of the local observer, let us suppose a geologist perfectly familiar with the undeniable indications of elevation or submergence within his own Atlantic field, is to resent this conception and conclusion of general present stability as too lightly putting aside factors of very positive significance.

The theorem is one of no little moment. Either the Atlantic coast is dancing up here and down there, as the Philistines have declared, bringing alternate hope and despair to riparian owners, or else it is standing flat and firm. We have learned that the uneasiest thing in the earth is the earth itself, the very philosophy of terrestrial equilibrium precludes the notion of too long stability or of an end to the rhythm of vertical vibration. So we may, probably we must take this notion of stability as one limited to an inappreciable change through the "present," the "historic" period, at all events one of brevity, and this is of course a different proposition than one of actual stability. I am of those who frankly resented Dr. Johnson's general conclusions, for my records are sufficiently profuse in what seemed best construed as local warpings. This was my attitude at a first reading of this and his other papers on this subject. A fallow interval and a second reading have led me to subject my data of apparent land rise and fall to his suggested treatment—to look at each by itself as a possibly localized effect of storm and stress against the coast, involving now and again the burying of woodlands, undermining and poisoning of forest growth by salt water, etc., and I am disposed to think that very many of the cases I am most familiar with on the Gulf of St. Lawrence coast may be resolved by such measures; and that, as the author himself has said, the absence of continuity in these destructive effects intimates their local character. Professor Ganong has recently suggested, concerning effects of this kind noted by him in New Brunswick, that it may be well to take record of the changes in the head-of-tide in seaboard streams. This would be an interesting procedure, but even here there is a chance for large error; granted that if the historic records of head-of-tide were trustworthy, such variables as the scouring of freshet streams and the stress conditions from off the sea must both be estimated.

There lies a large value in these conclusions of stability, though I confess to little enthusiasm over some of the procedure by which the conclusion is reached. It may be a new geographical principle that assumes differences in high level between the waters of a barachois and those of the open sea from which it is severed by a bar gullied with tidal tickles; and the vigorous attack by quiet and sheltered barachois waters against their bounding land, even when the gale blows hardest, is rather too leonine for general belief.

The geologist, in considering such facts, will not forget that in dealing with the north Atlantic seaboard, we are facing a rias coast; in other words, the ocean forces, under prevailing winds, strike the anticlines and synclines of Appalachian land, head on, beating against their ends, not their flanks. They are playing at the greatest advantage in down-breaking ridges and overwhelming valleys. In fact, in many places in the northeastern and St. Lawrence lands the waters of the new bays lie in the old synclines of the paleozoic. Under such conditions of long-continued turmoil and attack where the tide can rush with immensely increased volume and impetuosity, at greatest destructive advantage, in among the ancient troughs, there is a vast chance for the production of conditions which might on the one hand suggest subsidence where poisoned forests are left by the retreat or lodging of the salt waters, and on the other intimate elevation, as the water level in times of reasonable quiescence lies below the field of its destruction in time of stress.

If one will leave the debatable ground of the coast itself and take to the continental islands, such as Prince Edward Island and the Magdalens, the evidence of present stability is fairly beyond stricture. The Magdalens are more particularly to the point as

they are far in the heart of the gulf, away from any recent entanglement with the mainland, which is not quite so true of Prince Edward Island. Here is a cluster of rock fragments knit together by sand bars which show no single trace or semblance of recent elevation or depression. Even the broad dune-covered bars patched with stunted spruce and dune-grass afford no indication of tree burial or poisoning by encroachment of the water without or of the great lagoons within. The rocks of the islands are rather homogeneous in quality, except for the volcanics. The sandstones are retreating rapidly under the wave attacks, and while the volcanics stand out in better resistance, the broad submarine platform about the islands is uniformly smoothed. The soundings of the admiralty chart show how uniform the smoothing has been. The five-fathom platform ties all the islands of the Magdalens proper into one. The walrus bones heaped together on the top of the low horizontal rock shelves where they were left by the hunters more than a century ago, lie as they lay then, only coated with a century of soil and quietly falling away into the sea as the waters gnaw down the rocks. The five-fathom level is approximately a true wave platform, but the ten-fathom level, which outlines a platform of a hundred times the present superficies of the surviving islands, is unquestionably a wave-cut level deeply submerged. In this ten-fathom level there is no appeal from the evidence of a submergence at a time not far back of the present or from the conclusion that the Magdalens are mere interwoven shreds of a once great island, but we must not be pressed to declare how long ago the negative movement ceased. Not long, probably; but for this day, this present, we lack the right to say that there is any movement in process, up or down. A clue is suggested as to the length of this actual stability; facing the great interior lagoon bounded by the double chain of sand bars are ragged rock cliffs, with bare faces that never could have been torn by the feeble waters of the lagoon even in times of tempest. These cliffs, now enmeshed by sand and facing only placid waters, were made ragged and bare in the days when the sea itself pounded at their base. Since then the whole network of sand has been built up about them, and yet all this without any definite indication of change of water level.

John M. Clarke

Einführung in die Mathematik für Biologen und Chemiker. Von Professor Dr. Leonor Michaelis, Privatdozent an der Universität Berlin. Verlag von Julius Springer, Berlin. 1912.

It is the purpose of this book to bring before the chemist and the biologist, in convenient form, some mathematical information that is necessary to an understanding of methods that are being used more and more in chemistry and biology. The first chapter of the book gives a recapitulation of some very elementary mathematics, including plane geometry, the most elementary algebra and trigonometry. The second chapter is given to the study of some very simple functions such as are usually treated in a first course in analytic geometry. The main part of the book is given to the calculus, to differential equations, and to applications to chemistry and physics.

The author has succeeded in bringing a large amount of useful material into a small space, and the book will perhaps serve well its purpose. Although the reviewer recognizes that, in an elementary book, one may sacrifice too much simplicity for the sake of precision in the statement of fundamentals, there is some danger that the chemist and biologist will get incorrect views as to the precision of the processes of differentiation and integration when presented as they are in this book. To illustrate, on p. 107, we find the statement

$$\sin\frac{dx}{2}=\frac{dx}{2}$$

and analogous statements are to be found at many points in the book.

I note the following numerical and typographical errors: Line 23, p. 37, should contain 0.7071 instead of 0.7069, and line 9, p. 107, should have

$$\frac{\sin \pi/2}{\pi/2} = \frac{1}{1.57}$$

instead of

$$\frac{\sin \pi/2}{\pi/2} = \frac{0}{1.58}.$$

In carrying out his purposes, the author has very properly included a brief treatment of exact and inexact differentials, Fourier's series, and the application of imaginary numbers to the solution of some differential equations that are important in mathematical physics.

The final chapter of the book is devoted to directions for the representation of experimental data by mathematical functions, but the presentation is so brief that it is doubtful if the biologist or chemist could carry the directions into numerical effect without more mathematics than is given in this book.

On the whole, the author has shown good judgment in the selection of material for his purposes, and the biologist and chemist not familiar with the calculus will find the book of value.

H. L. RIETZ

Radioactive Substances and Their Radiations. By E. RUTHERFORD. Cambridge, University Press. 1913. Pp. vii + 700. Price, $4.50.

The subject of radioactivity is now just sixteen years old, yet the volume of its literature already compares favorably with that of any of the other grand divisions of physics and two compendious text-books, Rutherford's and Madame Curie's—not to mention a host of less pretentious treatments—are available to initiate the student into its mysteries.

It is now eight years since the second edition of Rutherford's "Radioactivity" appeared, and in view of the fact that this period covers one half of the life of the science, it is scarcely to be expected that its present status could be adequately presented by a mere revision of that book. And it is to the author's credit that he has not attempted to patch the new material into the old frame, but has instead built an entirely new framework and merely utilized the old lumber wherever it still proved serviceable.

Out of a total of 700 pages, only about 150 are taken from the former work. Despite this fact, the present book makes very much the same impression as did its predecessor, whether it is given merely a cursory glance or whether it is made the subject of careful study. This is because the big problems of radioactivity were correctly solved at the start, and that largely by Rutherford himself. It is one of the most notable facts connected with this notable subject that within eight years of the discovery of the first radioactive rays, the phenomena of radioactivity should have been so thoroughly worked out and so unerringly interpreted that scarcely a viewpoint then taken in a book of 560 pages needs, after eight more years of exceedingly active experimenting, to be discarded.

The differences between the old book and the new are to be found not so much in method of treatment or in order of presentation, as in the incorporation of the new material which has accumulated within the past eight years. Much of this material has grown out of researches conducted in Rutherford's own laboratory. The additions have come chiefly from the careful study of the following subjects, none of which are found in the old text.

1. The range of the alpha particle, the law of its scattering in passing through matter, and the stopping power of substances for it. Through studies in these fields has come a great addition to our knowledge of the nature of the atom and the character of radioactive changes.

2. The phenomena of recoil, undiscovered when the old book was written, but recently diligently studied and shown to be invaluable as a means of separating radioactive products.

3. The methods of directly counting the alpha particles, one of which, namely, the scintillation method, has recently been of great help in the study of the short-lived products.

4. The scattering and change in velocity of the Beta rays in passing through matter and the remarkable resolution into a large number of homogeneous components of the Beta rays emitted by Radium *C*—studies which have thrown new light on the nature of the atom.

5. The connection between the Beta and the Gamma rays, the recent investigation of which has raised new and interesting questions regarding the nature of electro-magnetic radiation itself.

6. The elaborate study of the thorium and actinium series of products, a study which has been chiefly responsible for the extension of the twenty radioactive products known in 1905, to the thirty-two known in 1913.

7. The new evidence for and against the activity of ordinary matter.

8. The bearing of radioactivity upon the age of the earth.

The author's style is always direct and simple and the present book, like its predecessor, can be read by those not trained in severe mathematical analysis. At the same time, the work of compiling has been carefully and thoroughly done, the references to the original articles are complete, and the author has been remarkably successful in dealing fully and fairly with the work of other investigators and in making a thorough and complete presentation of the facts and theories of radioactivity as they stand in the year 1913. This book will undoubtedly be the standard work on radioactivity for the next five or six years at least.

R. A. Millikan

University of Chicago,
Ryerson Physical Laboratory,
June 2, 1913

SCIENTIFIC JOURNALS AND ARTICLES

The April number (volume 14, No. 2) of the *Transactions of the American Mathematical Society* contains the following papers:

J. L. Coolidge: "A study of the circle cross."

W. W. Denton: "Projective differential geometry of developable surfaces."

K. P. Williams: "The solutions of non-homogeneous linear difference equations and their asymptotic form."

A. B. Coble: "An application of finite geometry to the characteristic theory of the odd and even theta functions."

W. F. Osgood and E. H. Taylor: "Conformal transformations on the boundaries of their regions of definition."

The May number (volume 19, number 8) of the *Bulletin of the American Mathematical Society* contains: Report of the February meeting of the Society, by F. N. Cole; "Three or more rational curves collinearly related," by J. E. Rowe; "Second note on Fermat's last theorem," by R. D. Carmichael; "An extension of a theorem of Painlevé," by E. H. Taylor; "Mathematical physics and integral equations," by W. A. Hurwitz; "Shorter Notices": Schulze's Teaching of Mathematics in Secondary Schools, by J. L. Coolidge; Hime's Anharmonic Coordinates, by J. V. McKelvey; Beutel's Algebraische Kurven, Zweiter Teil, by H. S. White; Scheffer's Lehrbuch der Mathematik für Studierende der Naturwissenschaften und der Technik, by A. R. Crathorne; Sainte-Laguë's Notions de Mathématiques, by R. C. Archibald; Weber and Wellstein's Encyklopädie der Elementar-Mathematik, Band III., by J. B. Shaw; Whittaker's History of the Theories of the Æther and Electricity, Krause's Theorie der elliptischen Funktionen and Mill's Introduction to Thermodynamics, by E. B. Wilson; Annuaire du Bureau des Longitudes pour l'An 1913, by E. W. Brown; "Notes"; "New Publications."

The June number of the *Bulletin* contains: Report of the spring meeting of the Chicago Section, by H. E. Slaught; "Concerning two recent theorems on implicit functions," by L. L. Dines; "Concerning the property Δ of a class of functions," by A. D. Pitcher; "The asymptotic form of the function $\Psi(x)$," by K. P. Williams; "An erroneous application of Bayes' theorem to the set of real numbers," by E. L. Dodd; "Shorter Notices": Weber's Partielle Differential-Gleichungen der mathematischen Physik, Band II., and Föppl's Theorie der Elektrizität, Band I., by J. B. Shaw; "Notes"; "New Publications."

SPECIAL ARTICLES

ACCESSORY CHROMOSOMES IN THE PIG

Several points of interest were brought to light in this study of the spermatogenesis of the pig and the relation of the accessory chromosomes to sex. Unusually good material was available for this investigation and it was found that eighteen chromosomes occur in the

spermatogonia. Two of these, undoubtedly the accessories, are oval in shape and somewhat larger than the others, which are rod-shape.

In the primary spermatocytes ten chromosomes appear in the late prophase of division, eight large bivalents plus the two unpaired accessories. In the metaphase of this division the accessories pass to one pole, undivided, and in advance of the other chromosomes. Thus, this division which is evidently the reduction division gives rise to two different types of secondary spermatocytes. The one type contains eight ordinary chromosomes or autosomes, and the other eight autosomes plus the two accessories.

In the late prophase and early metaphase of division in the secondary spermatocyte four large chromosomes appear in the one type of cell and four plus the two accessories in the other. Thus a second fusion of the autosomes in pairs has evidently taken place. This is not to be looked on as a second reduction division, however, as the autosomes in the late metaphase of division in these cells manifest their bivalent nature again. The secondary spermatocytes containing the four large chromosomes give rise to two spermatids each with four bivalents or eight univalents; and those containing the four large chromosomes and the two accessories give rise to spermatids containing four bivalents or eight univalent chromosomes plus the two accessories which have divided here for the first time since the last spermatogonial division.

The spermatids transform directly into spermatozoa. The conspicuous centrosome emerges from the sphere and divides into two parts which for some time remain connected by a thick strand of material. The anterior centrosome comes in contact with the nuclear wall while the posterior one becomes transformed into a ring through which extends the developing axial filament. In the meantime the sphere migrates around the nucleus to a point opposite the anterior centrosomes where it becomes fixed as the acrosome. Long before the axial filament is fully developed the posterior ring-shaped centrosome is thrown off and lies in the cytoplasm away from the axial filament. During the final development of the spermatozoan a large mass of cytoplasm containing the posterior centrosome is thrown off by the cell. Careful measurements of a large number of the mature spermatozoa show that they are of two distinct types, one being much larger than the other.

The investigation was extended to studies of the germinal and somatic cells of both male and female pig embryos. It was again found in the male that the spermatogonial number of chromosomes is eighteen and that the same number prevails in the somatic cells, two of the chromosomes being somewhat larger. Twenty chromosomes, four somewhat larger and evidently the accessories, were found in the oogonia, and the same number prevails in the somatic cells of the female. It is evident that the eggs containing the reduced number of chromosomes, which is ten, when fertilized by the one type of spermatozoan containing ten chromosomes give rise to individuals containing twenty chromosomes in their cells, or females; while those fertilized by the other type containing only eight chromosomes give rise to individuals with eighteen chromosomes in their cells, which was found to be the number in the male.

Many investigators have found a similar dimorphic condition in the number of chromosomes in the two sexes of some of the invertebrates; and although the same condition was predicted to exist in the vertebrates possessing the X-element, it has, heretofore, never been actually shown.

N. E. Jordan in a recent abstract[1] says that the heterochromosomes are unquestionably lacking in the pig and several other mammals. Since the appearance of this article I have carefully reinvestigated my material and am thoroughly convinced that my conclusion is correct. A detailed account of this investigation will be published later.

J. E. WODSEDALEK

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January 30, 1913

[1] SCIENCE, N. S., Vol. XXXVII., No. 946, pp. 270–271.

THE EFFECT OF EXTERNAL STIMULI UPON THE CELL

The structure of the trophoplasm is an expression of the physiologic state. This structure consequently varies with the changing functional phases of the trophoplasm. Thus, in the root tip of *Vicia faba* the trophoplasm in the later stages of inanition becomes homogeneous; under the influence of antipyrine it becomes beautifully alveolar; under the influence of caffein it becomes granular; and in cells subjected to high pressure it becomes filar. The quantity of the trophoplasm is reduced as the cell activities are increased above the normal. Thus, in cells exposed to temperatures of 38 degrees Centigrade the trophoplasm is greatly reduced in quantity, and may appear not unlike the trophoplasm in advanced stages of inanition. A similar reduction is noticeable when cells are subjected to two-per-cent. solutions of antipyrine. On the other hand, cells subjected to low temperatures—zero degrees Centigrade to +2—the cell activity is reduced and the trophoplasm increased in quantity. The same is true, though to a less extent, when cells are subjected to a two-per-cent. solution of chloral hydrate.

The kinoplasm is physiologically and morphologically distinct from the trophoplasm. It is destroyed at temperatures near zero degrees Centigrade and at 38 to 40 degrees. The trophoplasm endures these temperatures for a considerably longer time, with little or no injury. Chemical agents, like chloral hydrate, readily destroy the kinoplasm with little or no injury to the trophoplasm. The nucleolus varies in size, being large when the cell activity is greatly reduced and small when the cell activity is greatly increased. It is to be looked upon as reserve food material for general cellular activity. It is not food material solely for kinoplasm, nor does its substance penetrate the trophoplasm and thus activate or produce the kinoplasm.

It is difficult or impossible to explain the behavior of the mitotic spindle under the different stimuli, physical and chemical, with many of the theories now held in regard to spindle mechanism as a function.

C. F. Hottes

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE SECTION G—BOTANY

The session of Section G, Botany, was held at Cleveland on the afternoon of Tuesday, December 31, 1912. The program consisted of the address of the retiring vice-president, Professor F. C. Newcombe, on the topic "The Scope of State Natural History Surveys," and of the following invitation addresses: "The Effect of External Stimuli upon the Cell," Professor C. F. Hottes; "A Plea for Closer Interrelations in our Work," Professor L. R. Jones; "A Field Study of Oriental Cycads," Professor C. J. Chamberlain. Professor Newcombe's address has appeared in Science, and the invitation addresses will also be published in Science.

Professor Henry C. Cowles was elected vice-president of Section G for the following year, and Professor W. J. V. Osterhout was elected secretary for five years. Professor F. C. Newcombe was elected a member of the sectional committee for five years. Professor C. E. Allen and Professor B. E. Livingston were chosen as a special committee to consider affiliation with the Botanical Society of America.

Henry C. Cowles,
Secretary

BOTANISTS OF THE CENTRAL STATES

A special business meeting of this organization was held in connection with the meetings of the American Association for the Advancement of Science at Cleveland, Tuesday, December 31, 1912. In the absence of the president, Professor T. H. Macbride, Past-president Professor F. C. Newcombe occupied the chair. The business of the meeting was to consider the desirability of again holding scientific sessions. The secretary read the results of a questionnaire that had been sent to the members, and in view of the large majority favoring active continuance, it was voted to hold meetings in the future in those years when the American Association for the Advancement of Science meets outside the territory of the Botanists of the Central States, which, broadly speaking, is the Mississippi Valley. Of those expressing an opinion, a majority favored holding meetings in conjunction with the zoologists, preferably about Easter.

Henry C. Cowles,
Secretary